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THE TREATMENT OF MENINGITIS DUE TO *HAEMOPHILUS INFLUENZAE* WITH STREPTOMYCIN*

A Report of Nine Cases

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INFECTIONS with *Haemophilus influenzae* in children constitute a serious problem. In adults, because of the presence of large amounts of potent bactericidal antibodies in the blood, this organism is much less frequently an instigator of disease processes.[1] During the pandemic of influenza in 1918, however, there were many cases in which the hemophilic organism was isolated from the lungs. It therefore appears that the normally present humoral protection against *H. influenzae* may break down under certain conditions and that this type of infection may be of great importance in all age groups. In children, there is no part of the respiratory system that is immune to invasion by this bacterium, and regardless of the location of the disease, the process is always serious and produces a high mortality rate unless promptly and efficiently treated. The other important type of infection produced by *H. influenzae* is meningitis, occurring most frequently between the ages of three months and two or three years; practically all these cases are due to organisms belonging to Type B of Pittman.[2]

The mortality rate in untreated cases of *H. influenzae* meningitis is between 92 and 100 per cent for all age groups. Weiss and Huntington[3] found the death rate to be 80 per cent in a group of 127 patients who were more than two years of age. Treatment with horse serum alone, with horse serum and complement and with sulfonamides alone or in combination with horse serum has produced little effect, and according to Fothergill,[4] the mortality rate ranges from 54 to 82 per cent in patients receiving these types of therapy. The most effective method of treatment of influenzal meningitis is that devised by Alexander.[5–7] This consists of the use of rabbit serum containing antibody against Type B organisms together with sulfadiazine. With this therapeutic regimen, the mortality rate was reduced by Alexander to 26 per cent in a group of patients ranging in age from three months to over five years; in those over seven months of age, the death rate was only 18 per cent.[8]

Although the results obtained by the use of type-specific antiserum and sulfadiazine are striking, there are still an appreciable number of deaths from influenzal meningitis treated in this manner. Furthermore, the employment of heterologous serum always carries with it the risk of immediate or late reaction owing to hypersensitization. The development of a nontoxic, nonsensitizing, easily given chemotherapeutic agent that can cure influenzal meningitis in as great a percentage as that achieved by Alexander's method or, if possible, in a larger number of cases of the disease appears to be most desirable.

In 1944, Schatz, Bugie and Waksman[9] reported the isolation of a new antibiotic agent from *Streptomyces griseus*, streptomycin, which was active against some gram-positive and many gram-negative organisms. Birmingham[10] has shown that *H. influenzae* is inhibited by streptomycin in a range of 1.56 to 5 gamma. Little information is as yet at hand regarding the effectivity of streptomycin in the therapy of *H. influenzae* infections in man, but several reports have appeared in the literature indicating that this agent may be of value in such cases. Birmingham[10] and Smith[11] have both reported recovery from influenzal meningitis following administration of streptomycin alone. The use of insufficient doses of the drug appeared to lead to the development of drug fastness in the causative organism. Both these investigators believe that the optimal treatment of influenzal meningitis should comprise streptomycin combined with sulfadiazine or serum or both and that the antibiotic agent should be given both intramuscularly and

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intrathecally. Most recently, Herrell and Nichols,[12] in a discussion of the clinical use of streptomycin in various conditions, have reported recovery in 4 cases of influenzal meningitis, 3 of which were due to Type B, the other being caused by an untypable strain; 2 of the patients received additional forms of treatment. The immediate results in all the cases were good, but 1 patient died two months later of a postmeningitic hydrocephalus.

The purpose of the work reported here was to determine the effect of streptomycin on the clinical course of influenzal meningitis, to study the rate of disappearance of the causative organism from the blood stream and spinal fluid and to note any toxic effects that might result from the use of large amounts of the drug.

Methods

Streptomycin therapy was not started in any patient until the diagnosis of meningitis due to *H. influenzae* was established by bacteriologic methods. In a few cases, the causative agent was detected on direct examination of the spinal fluid by the production of capsular swelling with Type B antiserum. In several cases, because of the absence of organisms in gram stains of centrifuged sediment of the spinal fluid, it was impossible to make an etiologic diagnosis until two to three days had elapsed. It was not deemed justifiable to withhold all therapy in cases in which the causative organism could not be detected early in the course of the illness, because all the patients had obvious purulent meningitis. Therefore, chemotherapy other than streptomycin was given until *H. influenzae* was isolated, but a period of at least twenty-four to forty-eight hours was allowed to elapse without any type of treatment before streptomycin was given. In this way, it was hoped to avoid treating patients with more than one agent at a time. In all the cases in which treatment was withheld for twenty-four to forty-eight hours, the presence of *H. influenzae* in the spinal fluid was confirmed before streptomycin was started.

Streptomycin was administered by two routes, intramuscularly and intrathecally, in a daily dosage of 120,000 to 1,000,000 units by the former route and one of 10,000 to 100,000 units by the latter. The intramuscular injections were spaced at three-hour intervals and each consisted of 15,000 to 125,000 units, whereas the intrathecal ones contained 10,000 to 100,000 units and were given once every twelve to twenty-four hours. Treatment was continued for seven to nineteen days intramuscularly and for at least four to seven days longer intrathecally. Samples of serum and spinal fluid were obtained for determination of levels of streptomycin, and these data will be reported later.

Cultures of the spinal fluid, blood, nose and throat in beef-heart-infusion broth and agar containing added yeast extract, tryptose peptone and blood were made daily during the course of streptomycin therapy and at frequent intervals after treatment was stopped. All the cultures were incubated at 37°C. under increased carbon dioxide tension for at least seven days before being discarded as showing no growth. All the organisms resembling *H. influenzae* morphologically were identified by the production of capsular swelling with Type B antiserum except in the cases due to a nontypable strain.

All patients treated with streptomycin were observed in the hospital for a period of at least two weeks after therapy had been stopped and were seen two to six weeks following discharge to note whether they developed any sequelae.

Case Reports

Case 1. C. W., a 5-year-old girl, was admitted to the Haynes Memorial Hospital with a chief complaint of vomiting and stiff neck of 24 hours' duration. She had been perfectly well until the evening before admission, when she began to vomit after every attempt to take food or water. A physician who was called prescribed sulfadiazine, which was not retained because of the vomiting. During the night, the temperature rose to 105°F., there were slight convulsive movements and the patient complained of severe headache. On the morning of entry to the hospital, the neck was stiff, the temperature was 103°F., and the patient was delirious.

Physical examination revealed the temperature to be 103°F., the pulse 140, and the respirations 22. The nose was moderately obstructed, but the mucous membrane was not inflamed. The pharynx was mildly injected, but the tonsils were not enlarged or reddened. The neck was stiff, and there was a moderate degree of cervical lymphadenopathy. The lungs, heart and abdomen were within normal limits. All the deep and superficial reflexes were present, normally active and equal on both sides. Plantar response was flexor. Kernig's sign was markedly positive bilaterally, and there was marked stiffness of the back.

The urine on admission was within normal limits. The hemoglobin was 9.3 gm., and the white-cell count 32,400, with 87 per cent neutrophils, 4 per cent lymphocytes and 9 per cent monocytes. Lumbar puncture on admission revealed an initial pressure equivalent to 160 mm. of water, with free dynamics. There were 6000 cells, 98 per cent of which were polymorphonuclear leukocytes. The total protein was 250 mg. per 100 cc. and the sugar 26 mg. A gram stain showed long and short pleomorphic gram-negative rods, which did not swell with Type A or B anti-influenza serum. Blood culture on admission yielded the same bacterium. Subsequent bacteriologic studies revealed the organism to be *H. influenzae*, belonging to neither Type A nor B.

Immediately after admission, the patient was given 3 gm. of sulfadiazine per day, with resulting blood levels of 10 to 24 mg. per 100 cc. On this treatment, the clinical condition improved gradually, signs of meningeal irritation lessened, and the white-cell count fell, but the temperature remained elevated. The spinal fluid during the first 2 weeks in the hospital showed a return toward normal, but the cultures remained positive for *H. influenzae* for the first week and a half. Late in the 2nd week, there developed a maculopapular itching rash that was thought to be due to the sulfadiazine. No therapy was given for 3 days, during which time the temperature was elevated, the patient again appeared extremely ill, and the spinal-fluid cultures grew the gram-negative organism. Sulfamerazine, in doses of 1.5 to 2.0 gm. per day, was therefore given, and for a week the temperature was more or less within normal limits, but one spinal fluid examination during this time still revealed the presence of the causative bacteria. On about the 10th day of treatment, the patient began to develop a fever and a maculopapular rash, and the drug was stopped for several days, during which the temperature returned to normal. After 4 days without any chemotherapy, however, the temperature suddenly rose to 104°F. and sulfamerazine was again given. For the next 3 weeks,

in spite of sulfamerazine blood levels ranging between 12 and 24 mg. per 100 cc., there was a daily elevation of temperature to a high degree, and spinal-fluid and blood cultures revealed the gram-negative pleomorphic rod. The patient again appeared quite ill, had marked anorexia, was very listless and showed signs of moderate meningeal irritation.

Streptomycin treatment was started at the end of the 8th week in the hospital. A dose of 5000 units was given intrathecally every twenty-four hours for the first three days and one of 10,000 units by the same route thereafter, the total dose being 255,000 units in 23 days. Shortly after therapy with the antibiotic agent was started, the temperature returned to normal, the white-cell count fell, and the blood and spinal-fluid cultures became negative. There was a concurrent rapid improvement in the clinical condition.

The patient was observed in the hospital for 3 weeks after streptomycin was stopped, and several lumbar punctures carried out during this period were all within normal limits.

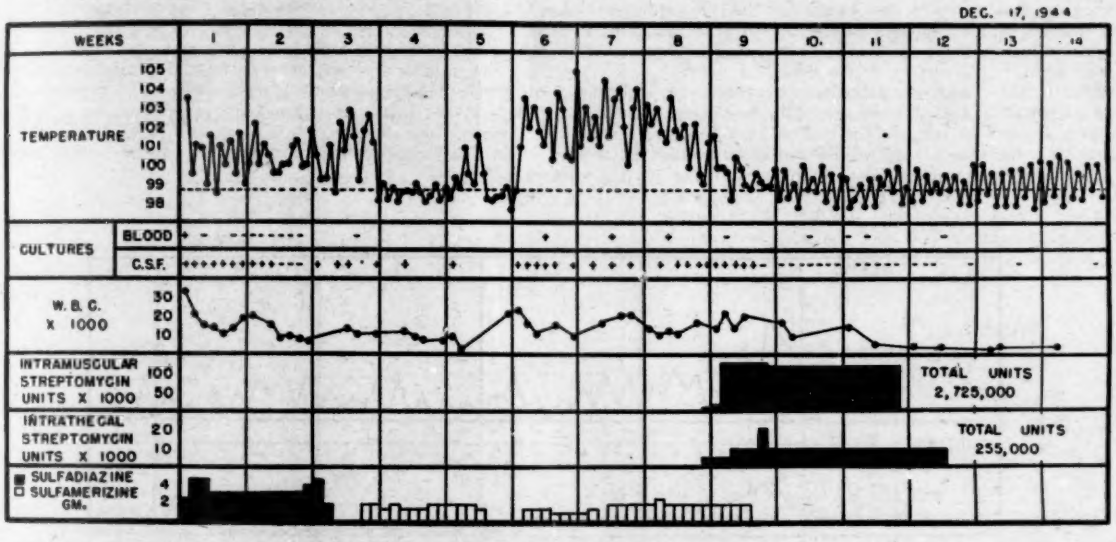

FIGURE 1. *Summary of Data in Case 1.*

Case 2. H. M., a 3-year-old girl, was admitted to the hospital with an illness that began the day prior to admission with nasal discharge, anorexia, irritability and sensations of chilliness. Later, sore throat and pain in the side of the neck developed, the respirations became labored, there was difficulty in swallowing water, and vomiting occurred. A dose of penicillin was given, and the patient was referred to the hospital with a possible diagnosis of poliomyelitis.

Physical examination on admission revealed a well developed, well nourished child who appeared acutely ill and held her head rigidly backward, resisting any attempt at flexion of the neck. The temperature was 102.8°F.,

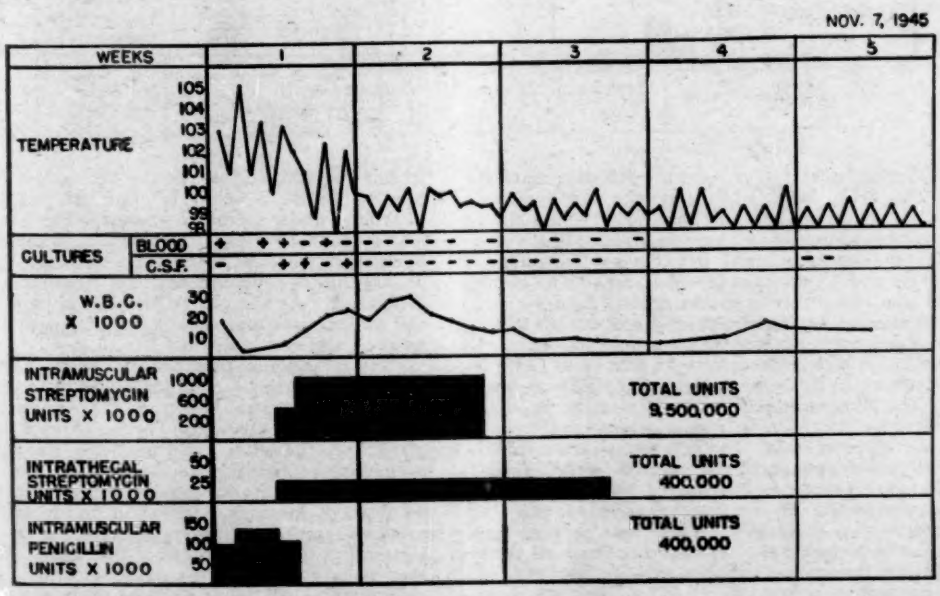

FIGURE 2. *Summary of Data in Case 2.*

the pulse 120, and the respirations 26. On the right side of the neck, behind the right mandibular angle, there was a small, hard, tender swelling that was surrounded by edema. There was enlargement of the tonsillar node on the left. The remainder of the physical examination was within normal limits. Kernig's sign was negative bilaterally, and stiffness of the back was not striking.

The white-cell count was 17,500, with 64 per cent neutrophils, 32 per cent lymphocytes and 4 per cent monocytes. The urine was essentially normal. The spinal fluid was under normal pressure and contained 10 lymphocytes and 6 polymorphonuclear leukocytes per cubic millimeter, the sugar and protein levels were normal and culture yielded no growth.

Shortly after admission the temperature rose to 105°F., and a dose of 15,000 units of penicillin was given intramuscularly every 3 hours. At the end of 18 hours, the temperature had decreased to 100.8°F., but it fluctuated between 101 and 105° for the next 3 days. On the 4th day, marked stiffness of the neck, back and hamstring muscles and positive Kernig signs became evident. The spinal fluid was under increased pressure and contained 1100 white cells per cubic millimeter, with 82 per cent polymorphonuclear leukocytes and 18 per cent lymphocytes. The sugar level was 21 mg. per 100 cc. and the protein level 63 mg. Type B *H. influenzae* was identified on direct examination.

Penicillin was stopped and a regimen of 25,000 units of streptomycin intrathecally once every 24 hours and 125,000 units of streptomycin intramuscularly every 3 hours was instituted. The temperature fell rapidly and by the 8th day had reached normal limits, where it remained during the rest of the hospital stay. The cell count in the spinal fluid gradually decreased, and the cultures for *H. influenzae*, which were twice positive during the first 3 days of streptomycin treatment, became negative on the 4th day and remained so thereafter. There was marked improvement in the patient's clinical condition, and all signs of meningeal irritation had disappeared at the end of 6 days of streptomycin treatment. The drug was continued both intramuscularly and intrathecally for 10 days, and by the latter route alone for 6 days longer.

The white-cell count, which fell to 4000 on the 2nd day, rose to 28,000 on the 10th day and returned to a normal level on the 16th day, where it remained for the rest of the period of observation. Blood cultures were positive for *H. influenzae* on the 1st, 3rd, 4th, and 6th days only once after the start of streptomycin treatment. X-ray examination of the chest on the 5th day revealed findings consistent with early bronchopneumonia. *H. influenzae* was isolated from nose and throat cultures for the first time on the 21st day. At discharge 34 days after admission, the patient showed no sequelae except moderate generalized weakness.

Case 3. L. A., a 2-year-old girl, was admitted with an illness that had begun 3 weeks previously, with mild obstruction of the nose and a high degree of fever. Because of the finding of moist rales in one of the lungs, treatment with one of the sulfonamides had been given for 4 days. Thereafter, fever recurred and the sulfonamide was readministered, but failed to produce any beneficial results. The patient was therefore admitted to a hospital for further study 4 days prior to admission to this hospital.

At the outlying hospital, a large number of white cells were found in the urine. Treatment with penicillin resulted in some improvement. On the night before admission to this hospital, stiffness of the neck and a rise in temperature to 103°F. developed. Lumbar puncture yielded a clear fluid under increased pressure. The patient was transferred to another hospital with the diagnoses of pyelonephritis and meningitis, type undetermined, having received 25,000 units of penicillin and 2 gm. of sulfadiazine just before discharge. At the second hospital, a rash was noted and the patient was sent to this hospital with a possible diagnosis of scarlet fever.

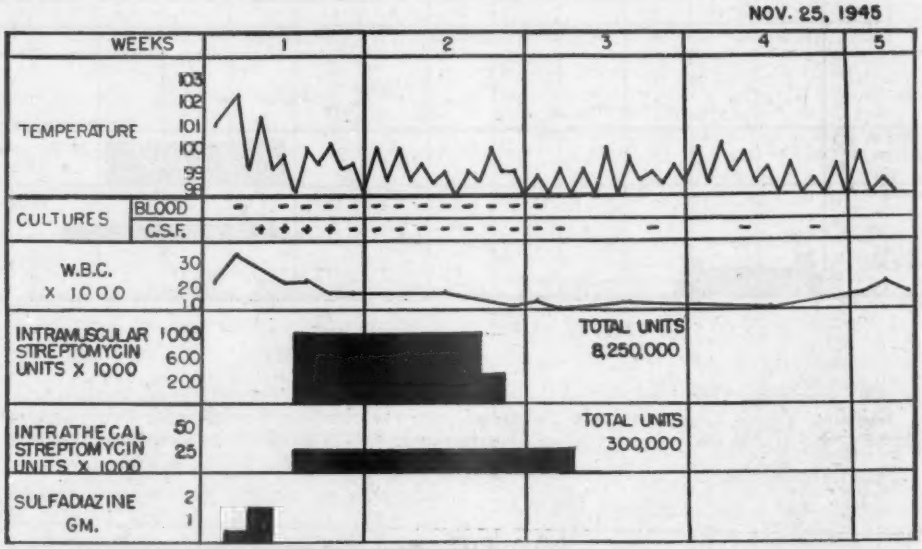

Figure 3. *Summary of Data in Case 3.*

Physical examination on admission revealed a pale girl who appeared to be chronically ill. The temperature was 100.4°F., the pulse 128, and the respirations 28. The skin showed a moderate degree of hyperkeratosis follicularis over the chest and abdomen. The remainder of the examination was within normal limits except for a few moderately enlarged anterior cervical lymph nodes. There were no signs of meningeal irritation or increased intracranial pressure except for slight tightness of the hamstring muscles bilaterally. The remainder of the neurologic findings were essentially normal.

The white-cell count on admission was 22,150, with 55 per cent neutrophils, 45 per cent lymphocytes and 1 per cent monocytes. The urine was normal except for 5 to 10 white cells per high-power field of a centrifuged specimen. Shortly after admission, the temperature rose to 102.4°F. and slight stiffness of the neck and increased spasm of the hamstring muscles became apparent. Lumbar puncture revealed increased pressure of the spinal fluid, which contained 389 cells per cubic millimeter of which 54 per cent were polymorphonuclear cells and 44 per cent

were lymphocytes. The sugar was within normal limits, and the protein was 39 mg. per 100 cc. No organisms were seen on smear. Since the etiology of the meningitis was unknown, the patient was treated with 1.5 gm. of sulfadiazine a day. Lumbar puncture repeated the next day showed essentially the same findings as on the day before.

On the 4th day, the cultures of the spinal fluid made on the 2nd and 3rd days were found to contain Type B *H. influenzae*. Sulfadiazine administration was stopped, and the patient was given no treatment for 24 hours. Streptomycin therapy, 125,000 units every 3 hours intramuscularly and 25,000 units every 24 hours intrathecally, was started and continued for 9 days by the former and for 3 days longer by the latter route.

There was rapid clinical improvement, and the abnormalities in the spinal fluid soon disappeared. *H. influenzae* was never isolated from the nose, throat or blood.

Case 4. W. St.L., a 3-year-old boy, was admitted with a chief complaint of convulsions of 24 hours' duration. One week prior to admission he had sustained a contusion on the back of the head as the result of a fall, and subsequently developed fever, nausea, vomiting and abdominal pain. He was treated for the next 5 days for gastroenteritis, but because vomiting and convulsions occurred 5 days after the fall, he was admitted to an outlying hospital for observation. Physical examination at that time revealed the patient to be acutely ill and in poor contact with his surroundings. The only neurologic finding was a moderate degree of opisthotonos. Twenty-four hours later, marked restlessness and delirium appeared and lumbar puncture yielded a reddish-colored spinal fluid under markedly increased pressure. Penicillin intrathecally and intramuscularly and sulfadiazine produced no improvement in 24 hours, and the patient was referred to this hospital.

Physical examination on admission revealed a well nourished, well developed boy who was in marked opisthotonos, restless and irritable and appeared extremely ill. The temperature was 100.6°F., the respirations 24, and the pulse 152. The mouth was dry, and the tongue coated. The neck and back were markedly stiff, with the head held in extreme extension, and the patient protested violently against any attempt at flexion. Kernig's sign was markedly positive bilaterally. The abdominal reflex in the left lower quadrant could not be elicited. The remainder of the examination was normal.

The urine on admission was within normal limits. The hemoglobin was 14.1 gm. The white-cell count was 22,900, with 72 per cent neutrophils, 26 per cent lymphocytes and 2 per cent monocytes. Lumbar puncture yielded a spinal fluid that contained 543 polymorphonuclear leukocytes and 424 lymphocytes per cubic millimeter. The sugar was 59 mg. per 100 cc., and the protein 87 mg., but no bacteria were seen on direct examination of a centrifuged specimen. Nose, throat and blood cultures revealed no *H. influenzae*. Cultures of the spinal fluid showed no growth after 24 and 48 hours. Because of the obvious purulent meningitis and the failure to discover the causative organism at the time of admission, the patient was given 3 gm. of sulfadiazine a day. On this regimen the temperature remained elevated, the patient continued to appear acutely ill, and opisthotonos persisted.

On the 4th day, because growth of the spinal-fluid cultures could not be detected by the ordinary methods, the supernatant was removed from the blood broth and centrifuged at 3000 r.p.m. for 30 minutes. Examination of the sediment revealed that *H. influenzae*, Type B, had been present in the spinal fluid from the time of admission. All therapy was omitted for the next 24 hours, during which time the temperature rose to its highest point, 103°F. On the 6th day, when the white-cell count was 31,000 and the temperature 103.8°F., treatment with streptomycin was begun. A dose of 100,000 units was administered intrathecally initially and doses of 25,000 units were given every 24 hours thereafter for 14 days. In addition a dose of 125,000 units was injected every 3 hours intramuscularly for 10 days.

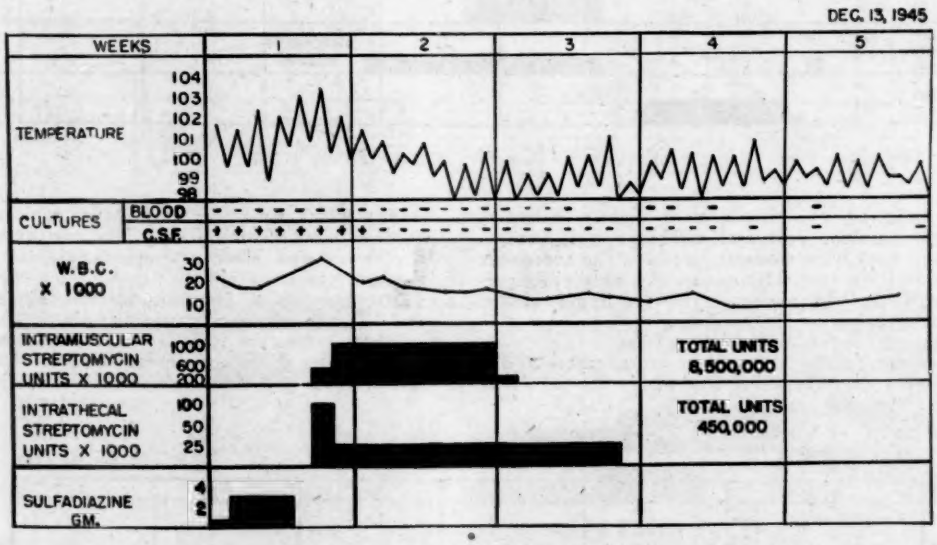

Figure 4. *Summary of Data in Case 4.*

Shortly after the beginning of streptomycin therapy, marked improvement in the clinical course was noted, and the patient was completely recovered 15 days after treatment was begun. Spinal-fluid cultures became negative 2 days after streptomycin was given, and the chemical and cellular abnormalities of the fluid rapidly disappeared. Numerous blood cultures made during the course of the disease were sterile.

Case 5. S. A., a 15-month-old girl, was admitted with a chief complaint of convulsions of 12 hours' duration. One week prior to admission, the patient developed a "cold," which was quite mild for the first few days but was followed by diarrhea consisting of several loose, nonbloody stools a day until 24 hours before entry. The next morning, the patient was irritable, refused to sit up and developed generalized twitchings. On admission to an outlying hospital, she was found to have a stiff back and neck, a temperature of 102°F., and a positive Kernig's sign bilaterally. The white-cell count was 19,500, and lumbar puncture yielded a spinal fluid that contained 4500 cells per cubic millimeter. Penicillin was immediately given intrathecally and intramuscularly, but when bacteriologic examination of the spinal fluid several hours later revealed Type B *H. influenzae*, anti-influenza serum was administered in doses of

5 cc. intravenously and 6 cc. intrathecally. The patient was referred to this hospital for further treatment.

Physical examination on admission revealed a well developed, well nourished child who was pale and irritable, breathed rapidly with grunting respirations and stared vacantly into space. The temperature was 104°F., the pulse 180, and the respirations 60. The left eardrum appeared thick and injected. The nose revealed a small amount of mucopurulent exudate. The pharynx was moderately injected, the tonsils were slightly enlarged, and a thick, purulent postnasal discharge was present. The neck and back were moderately stiff. The neurologic findings were within normal limits except for a slightly positive Kernig's sign bilaterally. The remainder of the examination revealed no abnormalities.

The white-cell count on admission was 16,850, with 45 per cent neutrophils, 52 per cent lymphocytes and 3 per cent monocytes. The urine was within normal limits except for a specific gravity of 1.032. The hemoglobin was 11.6 gm. Examination of the spinal fluid revealed 165 polymorphonuclear leukocytes, 3000 lymphocytes and 5000 erythrocytes per cubic millimeter; the protein was 252 mg. per 100 cc., and the sugar 65 mg. Gram stains and cultures of the spinal fluid on admission were negative for *H. influenzae* or any other organism.

Because of the rapid fall in temperature and the general clinical improvement, as well as the negative blood and spinal-fluid cultures, all therapy was witheld for the first 3 days. At the end of this time, spinal fluid withdrawn on the 2nd day was found to contain *H. influenzae*; sulfadiazine, 3 gm. per day orally, was therefore started. Lumbar punctures on the 8th, 10th, 12th and 13th days, made while the patient was receiving sulfadiazine, revealed *H. influenzae*. All therapy was then stopped for 48 hours during which time the temperature rapidly rose to fluctuate between 99 and 103°F. The patient again appeared acutely ill, and blood and spinal-fluid cultures grew out the hemophilic bacteria.

Streptomycin, 25,000 units intrathecally every 24 hours and 125,000 units intramuscularly every 3 hours, was first administered on the 16th day and was continued for 8 days by the latter route and for an additional 6 days by the former route. Within a short time after the initiation of this treatment, the temperature returned to within normal limits and marked improvement in the general clinical condition was noted. The spinal fluid showed a rapid return to normal. A mild elevation of temperature from the 27th through the 30th day was concomitant with a bout of diarrhea consisting of several loose, nonbloody stools a day, from which no pathogenic enteric organisms

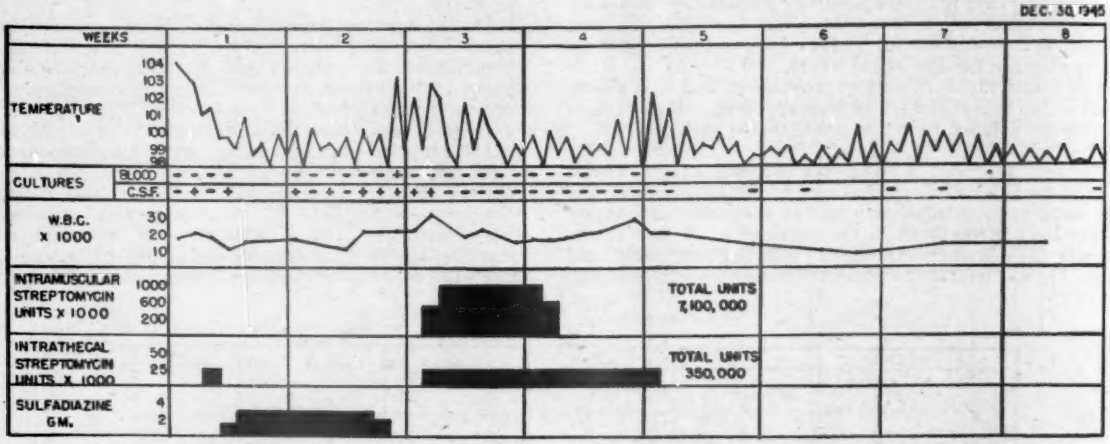

FIGURE 5. *Summary of Data in Case 5.*

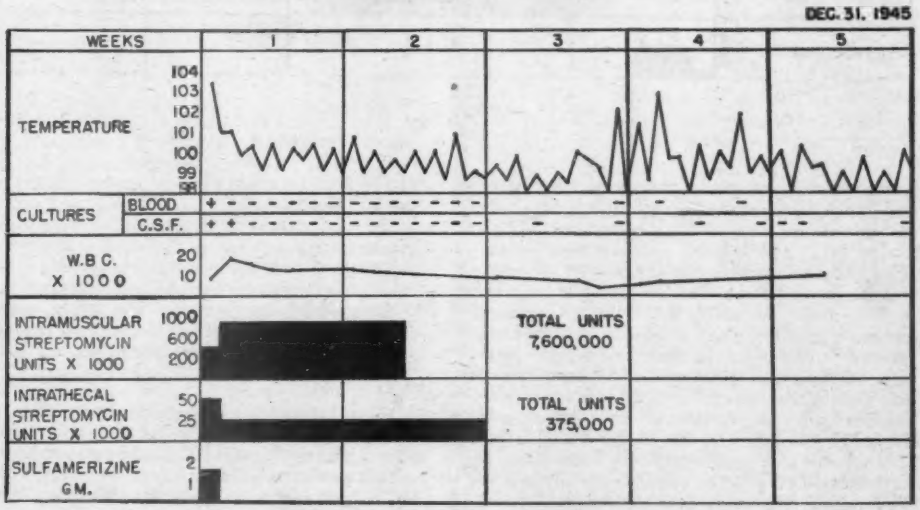

FIGURE 6. *Summary of Data in Case 6.*

could be cultured. All blood and spinal-fluid cultures made during the time of streptomycin treatment and after the antibiotic substance was stopped were sterile. The patient was kept in the hospital for 4 weeks following the completion of treatment and remained completely well.

CASE 6. H. M., a 3-year-old boy, entered the hospital with a chief complaint of fever and vomiting of 12 hours' duration. He had been well until 4 days prior to admission, when he began to suffer with poorly described discomfort in the left ear. No other symptoms appeared until the day before admission, when severe anorexia, fever, restlessness, increased irritability and vomiting were present. A physician who saw the patient on the following day found him to have a temperature of 103°F. and a stiff neck and referred him to the hospital.

Physical examination on admission revealed a well developed, well nourished boy who was comatose and responded only to extremely painful stimuli. The temperature was 102°F., the respirations 36, the pulse 124, and drug was administered intramuscularly every 3 hours in doses of 100,000 units for 10 days and intrathecally every twenty-four hours in doses of 25,000 units for 14 days.

The clinical course was marked by rapid improvement, so that within 1 week the patient appeared to be completely recovered. A rise in temperature to 102°F. on the 21st day occurred, with an acute suppurative otitis media, from which a hemolytic *Staphylococcus aureus* but not *H. influenzae* was isolated. This condition subsided without any treatment in a few days. After therapy was started, cultures of the blood were never positive and those of the spinal fluid revealed the causative organism only once. Daily cultures of the nose and throat revealed Type B *H. influenzae* — for the first time on the 29th and 30th days.

CASE 7. W. V., a 4-month-old boy, was admitted because of convulsions of 24 hours' duration. The present illness began 10 days prior to admission, when the patient

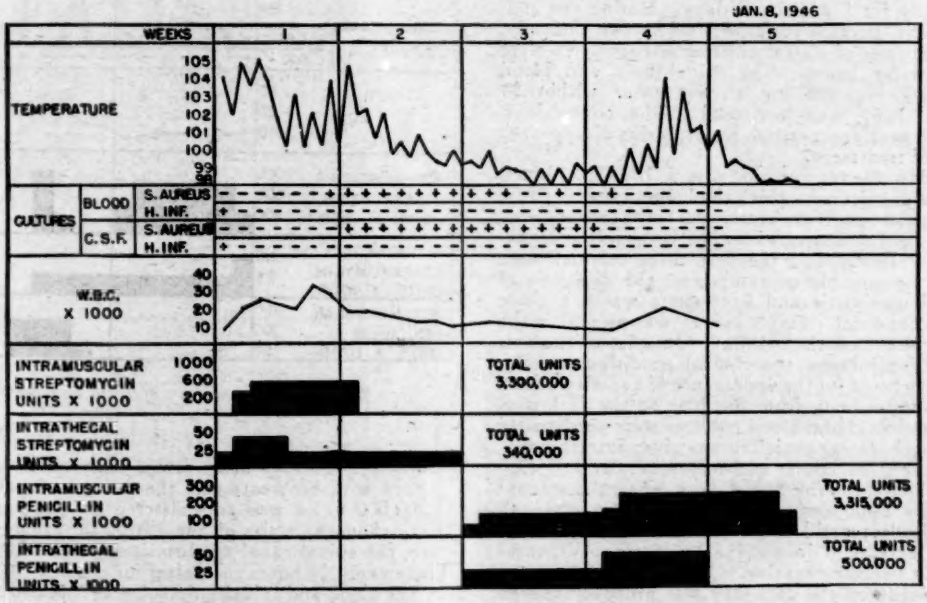

FIGURE 7. *Summary of Data in Case 7.*

the blood pressure 75/40. In the skin over the medial aspect of the lower left leg were several small, edematous, papular areas, the tops of which were crusted. The left eardrum was diffusely reddened, but the landmarks could be made out easily. The eyes moved aimlessly. The pharnyx and tonsils were markedly reddened but no exudate was seen. The neck and back were extremely stiff. Neurologic examination was essentially negative except for absent abdominal reflexes and a strongly positive Kernig's sign bilaterally.

The urine on admission was entirely within normal limits. The hemoglobin was 16.2 gm. The white-cell count was 7950, with 79 per cent neutrophils, 16 per cent lymphocytes and 5 per cent monocytes. Lumbar puncture on admission revealed an initial pressure equivalent to 480 mm. of water, with normal dynamics, and the spinal fluid contained 3650 cells, 99 per cent of which were polymorphonuclear leukocytes. The protein was 250 mg. per 100 cc., and the sugar 54 mg. A gram stain showed pleomorphic gram-negative rods that proved to be Type B *H. influenzae* both by direct typing and by culture. Blood cultures yielded the same organism.

Because of an error in the bacteriologic diagnosis on the original examination of the spinal fluid, the patient was given 1.5 gm. of sulfamerazine intravenously. When the presence of *H. influenzae* was detected 1 hour later, streptomycin, 50,000 units intrathecally and 100,000 units intramuscularly, was given immediately. Thereafter, the

developed a mild upper respiratory infection, which had an uneventful course until the 4th day, when the temperature rose to 103°F. The patient did not appear particularly ill, but on the next day the temperature was 104°F. Examination by a physician at that time revealed nothing of note, and treatment with an antipyretic led to a fall in temperature to 100°F. for 24 hours. The next day the temperature was 103°F. and the patient was given one of the sulfonamide drugs; this produced a moderate degree of improvement. On the day before admission, the patient began to have generalized convulsive seizures, which rapidly increased in frequency and duration until they were present almost constantly at the time of entry to an outlying hospital, where a lumbar puncture revealed cloudy spinal fluid containing gram-negative pleomorphic bacteria. Because of this finding, the child was referred to this hospital for treatment.

On admission the patient was a well developed, moderately obese infant who held himself rigid, with all the extremities in flexion and the head in extension. The temperature was 102.2°F., the respirations 32, and the pulse 130. The anterior fontanelle was wide open and bulging. The lower part of the right tympanic membrane was red, and the light reflex and visibility of the bony landmarks were diminished. The eyes followed a bright light to the right but not to the left. The nose contained a small amount of purulent exudate, and the mucous membrane was reddened. The pharynx was slightly reddened

but otherwise normal. The neck and back were extremely rigid. Kernig's sign was markedly positive bilaterally. The examination was otherwise within normal limits.

The urine on admission was normal except for a slight amount of albumin. The white-cell count was 8500, with 46 per cent neutrophils, 49 per cent lymphocytes, 3 per cent monocytes and 2 per cent basophils. The hemoglobin was 11 gm. The spinal fluid was under increased pressure and contained 36,400 cells per cubic millimeter, 91 per cent of which were polymorphonuclear leukocytes. The sugar was 30 mg. per 100 cc., and the protein 50 mg. Many gram-negative pleomorphic rods that exhibited capsular swelling with Type B anti-influenza serum were present. Cultures of the spinal fluid, blood and nose were positive for Type B *H. influenzae*. This organism could not be demonstrated in the pharynx.

Immediately after the etiology of the meningitis had been established, a dose of 20,000 units of streptomycin was administered intrathecally. Twenty-four hours later, drug administration by the intramuscular route in doses of 50,000 units every 3 hours was also started. Therapy was continued by intramuscular injection for eight days and nitrathecally for 5 additional days. During the 2nd, 3rd and 4th days, because of failure to improve clinically, intraspinal injections of 20,000 units of streptomycin were given every twelve hours. The spinal fluid and blood cultures became negative for *H. influenzae* within 24 hours after therapy was instituted. The convulsions, twitchings, stiff neck and positive Kernig's sign disappeared after 11 days of treatment.

On the 8th day, the temperature rose to 104.6°F. Blood and spinal fluid cultures, which had been made daily, showed a coagulase-positive hemolytic *Staph. aureus* continually from the 7th day onward, but because the organisms grew very slowly and the first three cultures were considered to be possible contaminants, the diagnosis of staphylococcal meningitis and bacteremia was not made until 1 week after onset. *Staph. aureus* was present in the nose in pure culture on the 8th day. In spite of the new infection of the meninges, the clinical condition was improving rapidly except for the appearance of a scarlatiniform rash over the entire body from the 10th to the 12th day.

Because spinal-fluid and blood cultures were persistently positive for *Staph. aureus* penicillin was given intrathecally, 25,000 units every 24 hours, and intramuscularly, 15,000 units every 3 hours, for the first 8 days, when the amount administered by each route was doubled because spinal-fluid and blood cultures still revealed the causative organism. Following the increase in dose of the antibiotic agent, these cultures rapidly became negative.

A febrile episode on the 26th day was probably related to an upper-respiratory infection, since redness of the pharynx and a watery nasal discharge were present at this time.

Type B *H. influenzae* was isolated from the throat in pure culture several times after recovery from the influenzal meningitis. The patient was observed in the hospital for 2 weeks following the cessation of penicillin treatment and showed no residua or sequelae of the meningeal infections. This part of the course of the illness is not included in Figure 7.

CASE 8. C. G., a 10-month-old girl, became ill 2 days prior to admission, when she cried much more than normally and became quite drowsy. On the day before entry, she began to vomit, appeared pale, was quite warm and slept almost constantly. Later in the day, when stiffness of the neck and a temperature of 103°F. were noted, the patient was referred to this hospital.

Physical examination revealed a well developed, well nourished girl who was extremely restless, breathed rapidly and emitted frequent high-pitched cries. The temperature was 105.6°F., the pulse 150, and the respirations 44. She reacted readily to painful stimuli. The anterior fontanelle was normal. There was an internal strabismus of both eyes. The neck and back were stiff. Kernig's sign was negative. There was a small area of consolidation in the midportion of the right lung posteriorly. The remainder of the physical examination was within normal limits.

The white-cell count on admission was 10,850, with 70 per cent neutrophils, 29 per cent lymphocytes and 1 per cent monocytes. The hemoglobin was 12.3 gm. The spinal fluid was under increased pressure and contained 18,250 cells per cubic millimeter, 80 per cent of which were polymorphonuclear leukocytes. The protein was 114 mg. per 100 cc., and the sugar 26 mg. Direct examination revealed gram-negative pleomorphic rods that gave capsular swelling with Type B anti-influenza serum. The blood culture revealed Type B *H. influenzae*. Nose and throat cultures were negative for *H. influenzae*.

Treatment with streptomycin was started immediately after admission. A dose of 100,000 units was given intra-

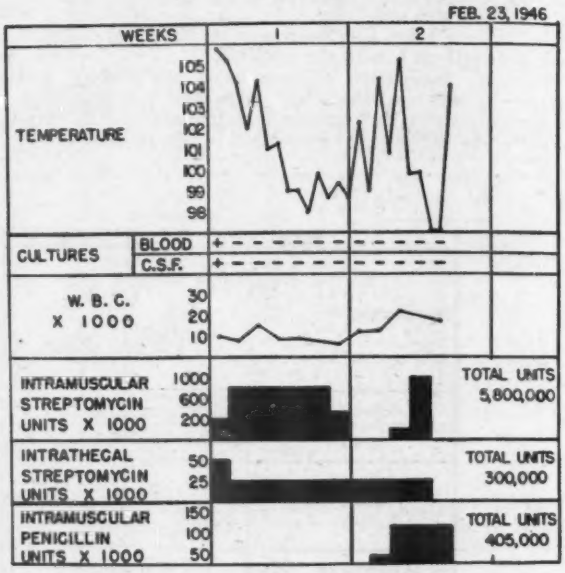

FIGURE 8. *Summary of Data in Case 8.*

muscularly every 3 hours for 5½ days. After a period of 2 days with no treatment, the drug was again given and 1,200,000 units was administered in the next 30 hours. Fifty thousand units of the antibiotic agent was instilled into the spinal canal on admission, and 25,000 units was given every 24 hours thereafter for the next 10 days.

The blood and spinal-fluid cultures revealed no organisms 24 hours after the beginning of treatment, and none were recovered during the remainder of the course. The clinical condition improved somewhat in that the temperature reached a normal level on the 5th day, but coma and twitchings persisted. On the 5th day, a pure culture of *Staph. aureus* appeared in the nose and throat, and this organism was isolated every day thereafter. On the 8th day, the temperature suddenly rose to 102°F., and it remained at high levels for the rest of the course. Physical examination at that time revealed no abnormalities, but on the following day moist, crackling rales were heard throughout both lung fields and x-ray examination revealed diffuse bilateral bronchopneumonia. Since it was thought that this was probably due to *Staph. aureus*, the patient was treated with penicillin, 15,000 units being given intramuscularly every 3 hours for the next 4 days. The patient remained in coma, convulsions became more frequent and severe, the temperature continued to be elevated, and death occurred on the 12th day. Blood cultures grew out *Staph. aureus* during the last two days of life.

Autopsy. The brain was within normal limits except for two small plaques of fibrin, one on each of the cerebral hemispheres; bacteriologic studies were negative. The lungs showed a diffuse confluent bronchopneumonia from which a coagulase-positive hemolytic *Staph. aureus* was isolated.

CASE 9. K. B., a 4-month-old-girl, was admitted with a history of having had a bronchopneumonia, which responded to one of the sulfonamides, 2 weeks previously. For 1 week before admission, diarrhea, consisting of seven

to twelve green, watery stools a day, had been present. Four days before entry, the patient had a "cold" and showed difficulty in swallowing. During the next few days, she became drowsy, and just before admission began to have twitchings of the right side of the head and frothed at the mouth.

Physical examination revealed a pale, emaciated girl who held her eyes wide open and her neck in slight extension. The temperature was 101°F., the pulse 150, and the respirations 30. The arms and legs were semirigid and flexed. There was marked looseness of the skin over the whole body. There was a small amount of purulent exudate in the nose. The neck and back were stiff. The lungs were clear except for coarse rhonchi throughout. All reflexes were physiologic. There was a thick, purulent vaginal discharge. The remainder of the physical examination was within normal limits.

The white-cell count on admission was 25,000. The urine was normal except for a large number of white cells. The hemoglobin was 9.3 gm. A lumbar puncture revealed increased pressure, and the fluid contained 910 cells per cubic millimeter, 80 per cent of which were polymorphonuclear leukocytes. The total protein was 95 mg. per 100 cc., and the sugar 34 mg. Direct examination revealed gram-negative pleomorphic rods resembling *H. influenzae* but not typable with either Type A or B serum. Culture of the vaginal discharge yielded *Proteus vulgaris* and colon bacilli. The blood was sterile. An untypable strain of *H. influenzae* was isolated from the pharynx.

Immediately after admission, the patient was started on a regimen of 100,000 units of streptomycin intramuscularly every three hours and was given 50,000 units of the same agent intrathecally. Intramuscular therapy was continued for 8 days. After the initial intraspinal dose, a dose of 25,000 units was given every 24 hours for 3 days and one of 50,000 units every 12 hours for the remaining 2½ days.

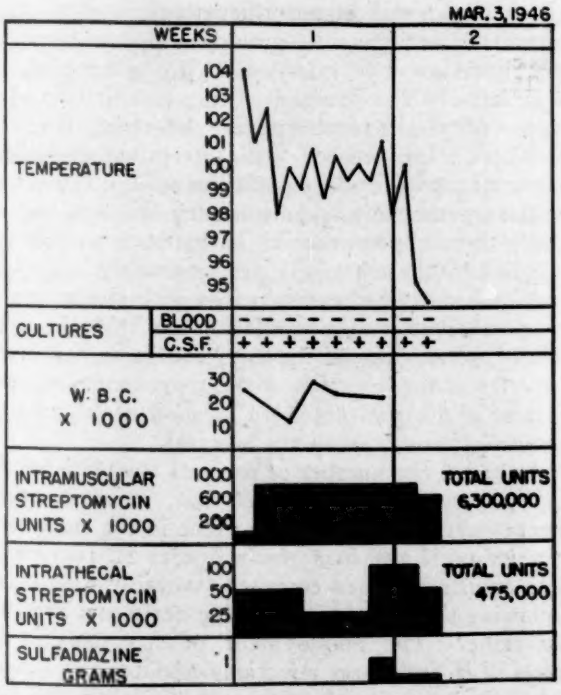

FIGURE 9. *Summary of Data in Case 9.*

The patient rapidly lapsed into coma, showed generalized twitchings and convulsions almost constantly and had persistent fever. The white-cell count remained high. Spinal-fluid cultures revealed the presence of *H. influenzae* on each of twelve examinations carried out over a period of 8 days. Cultures of the blood were repeatedly negative. On the 9th day, the rectal temperature dropped to 95°F. and the patient died, respirations ceasing 10 minutes before the heart stopped.

Autopsy. There was hydrocephalus with marked destruction of brain tissue and many areas of fibrin, particularly about the base, from which a nontypable *H. influenzae* was isolated.

The strain of *H. influenzae* isolated from the patient was subsequently found to be susceptible to 1.25 units of streptomycin per cubic centimeter (cup method, with the Merck strain of *Staph. aureus* as the control). Concentrations of streptomycin considerably larger than this were presumably present in the spinal fluid at all times.

DISCUSSION

Nine cases of acute purulent meningitis due to *H. influenzae* were treated with streptomycin, with good results in 7 cases. In 7 cases the organisms belonged to Type B, whereas in the other 2 the bacteria were neither Type A nor B. Bacteremia was present in 7 cases at the time the meningitis was first diagnosed. The age of the patients infected with the Type B organisms varied from four months to three years, whereas the children from whom the nontypable strains were recovered were four months and five years old, respectively.

Two of the patients died. One, aged ten months, was infected with a Type B organism that disappeared from the spinal fluid and blood after twenty-four hours of streptomycin treatment. This patient subsequently developed a *Staph. aureus* bronchopneumonia and succumbed in spite of intensive penicillin therapy. At autopsy the brain revealed only two small plaques of fibrin on the cerebral hemispheres; cultures were sterile. The other patient succumbed to persistent influenza bacteria infection, which showed no response to treatment with large amounts of streptomycin. *H. influenzae*, type unknown, was cultured from the brain at autopsy.

It was the purpose of the work reported herein to determine the value of streptomycin alone in the treatment of influenzal meningitis. In every case in which prior treatment with sulfonamide or other agents had been given, a period of twenty-four to forty-eight hours without therapy of any type was therefore allowed to elapse before streptomycin was administered, to eliminate the possibility of treating with two agents at the same time and also to assure the presence of active, progressing infection. It is problematical whether prior treatment with sulfadiazine had any favorable influence on the later effectiveness of streptomycin. It is noteworthy that, in every case in which the sulfonamide was used, organisms were constantly present in the spinal fluid in spite of adequate blood concentrations of the drug. In some of the cases, however, there was some degree of clinical improvement during the period of sulfadiazine therapy. This may indicate that the infection of the meninges had been partially inhibited but not eradicated by the administration of sulfonamide; this possibility is borne out by the fact that omission of all therapy

rapidly produced increased severity of clinical manifestations, bacteremia and an increase in the abnormal changes in the spinal fluid.

The portal of entry for *H. influenzae* infection in most cases appeared to be the upper respiratory tract. In 2 cases, otitis media was present; in neither of these, however, were the gram-negative bacteria isolated from the ear. In 6 cases *H. influenzae* was isolated from the pharynx and nose. It is interesting that in 2 of these cases the organisms could not be recovered until after the patients had been treated with streptomycin and were recovering from the meningitis.

The dosage and time of administration of streptomycin were chosen more or less arbitrarily. In Case 1, relatively small amounts of the drug were injected because only little of the material was available. In the other 8 patients between 800,000 and 1,000,000 units was given daily in divided intramuscular doses every three hours. Every patient received, in addition, between 20,000 and 100,000 units of the drug intrathecally because, as has been shown by Anderson and Jewell,[13] streptomycin does not enter the spinal fluid in appreciable amounts when injected either intramuscularly or intravenously. The usual procedure was to give 50,000 or 100,000 units intraspinally when treatment was first started and to instill 25,000 units every twenty-four hours thereafter. In two cases, it was considered necessary to give the drug more frequently by the intrathecal route; in these cases it was administered every twelve hours for several days. The total dosage of streptomycin for the entire period of treatment varied between 2,725,000 and 9,500,000 units intramuscularly and 225,000 and 475,000 units intrathecally. Whether the quantity of streptomycin used in the cases reported was larger than that actually necessary to cure influenzal meningitis can be determined only from experience with the use of smaller doses. The possibility of administering the antibiotic agent by the intrathecal route alone in cases of meningitis due to *H. influenzae* suggests itself, but such a procedure appears too risky, because about 70 per cent of patients with this disease have concurrent bacteremia. Reduction of the length of time over which intramuscular therapy is given seems more feasible because, in most cases, the blood was found to be sterile after twenty-four to forty-eight hours of treatment.

In most cases, the rapidity with which both spinal fluid and blood were rid of *H. influenzae* following the administration of streptomycin is extremely striking. Of the 8 patients treated with large doses, the spinal fluid was free of the hemophilic bacteria in 2 cases in less than twenty-four hours and in 5 between twenty-four and forty-eight hours. In 1 case, the organisms never disappeared. In the patient given relatively small doses of the drug, ninety-six hours was required before sterilization of the spinal fluid was accomplished. Disappearance of the infecting organisms from the blood stream was even more rapid than that from the spinal fluid. In only 1 case was bacteremia still present twenty-four hours after the beginning of treatment; in all the others the blood was free of bacteria in less than twenty-four hours. The fact that large amounts of streptomycin do not prevent the establishment of a new infection by an organism not susceptible to the drug is illustrated by the 2 patients who developed *Staph. aureus* meningitis and bronchopneumonia with bacteremia while undergoing treatment for the *H. influenzae* infection. No toxic effects directly related to streptomycin were observed.

The development of severe infections with *Staph. aureus* in 2 cases is worthy of note. It is striking that in both these cases the organisms appeared in pure culture in the nasopharynx before they invaded more deeply. It is possible that streptomycin, by altering the relation of the various organisms in the pharnyx, may, in some situations, allow relatively insusceptible organisms like *Staph. aureus* to increase rapidly in numbers and virulence. The use of penicillin in combination with streptomycin for the treatment of gram-negative infections suggests itself as a possible procedure in avoiding late complications by infection with gram-positive organisms. The necessity for careful frequent study of the nasopharyngeal bacterial flora in patients being treated with streptomycin seems apparent, and the use of penicillin when many gram-positive pathogenic organisms such as *Staph. aureus* make their appearance, in an attempt to prevent invasion by these bacteria, seems strongly indicated.

All the recovered cases treated with streptomycin were observed on the wards for two to four weeks following cessation of therapy, and in no case were sequelae of the infection or the treatment observed. Several of the patients were in good health two to six weeks after leaving the hospital.

Although the number of patients treated is small, the present study indicates that, in most cases, streptomycin is an effective agent in the treatment of meningitis and bacteremia due to H. *influenzae*. The results obtained compare favorably with those following the use of type-specific antiserum and sulfadiazine. The employment of streptomycin in cases of *H. influenzae* infections obviates any danger inherent in serum therapy and eliminates the necessity for frequent titrations to demonstrate excess antibody levels. It also precludes the occurrence of toxic reactions that may result from sulfadiazine. So far as can be determined, streptomycin is without appreciable toxic effect in man. When available in sufficient quantities, it seems to be the drug of choice in the treatment of disease produced by *H. influenzae*.

Summary and Conclusions

Nine cases of purulent meningitis due to Type B *Haemophilus influenzae* in 7 and to an untypable strain in 2, were treated with streptomycin, with complete recovery in 7 cases. The drug was given intramuscularly in doses ranging from 15,000 to 125,000 units every three hours and intrathecally in amounts varying from 10,000 to 25,000 units every twenty-four hours.

Two of the 9 patients with influenzal meningitis treated with streptomycin died. One showed complete absence of response to the antibiotic agent. The other died of an intercurrent *Staphylococcus aureus* bronchopneumonia, which was not affected by penicillin.

The blood and spinal fluid were cleared of the causative organisms in twenty-four to forty-eight hours in all cases except the 2 due to atypical strains.

No relapses or sequelae of the influenzal meningitis were observed in any of the recovered patients over a period of six to ten weeks following the cessation of streptomycin treatment.

No toxic reactions attributable to streptomycin were observed in the nervous, hematopoietic or urinary systems.

Two of the patients receiving streptomycin developed infections, in one case meningitis and in the other bronchopneumonia, — both with bacteremia, — due to *Staph. aureus* after they were completely free of *H. influenzae* in both the spinal fluid and blood for several days and were apparently recovering clinically.

Since *Staph. aureus* infections may occur as complications during treatment with streptomycin, careful watch must be maintained for early signs of this type of involvement. The use of penicillin as soon as *Staph. aureus* becomes the predominant organism in the nasopharynx, even before the evidence of invasion is present, is strongly recommended. The possibility of administering penicillin and streptomycin together from the time treatment is started suggests itself.

Streptomycin appears to be the drug of choice in the treatment of meningitis due to *H. influenzae*. It should be administered by both intrathecal and intramuscular routes. There seems to be no need to combine the antibiotic agent with one of the sulfonamides or with type-specific antiserum unless no beneficial effects result from the use of large amounts of streptomycin given for at least seventy-two to ninety-six hours.

Addendum. Another patient with meningitis due to Type B *H. influenzae* has recently been treated with streptomycin. This four-year-old boy recovered after treatment for six days by the intramuscular and ten days by the intrathecal route, the causative organism disappearing from the cerebrospinal fluid in less than twenty-four hours. Recovery was complete and no sequelae were evident six weeks after discharge from the hospital.

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NEW EXPERIENCES IN GROUP PSYCHOTHERAPY*

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THIS paper presents a report on the mass handling of large groups of borderline neuropsychiatric casualties on an open ward in the large naval hospital at Aiea Heights, Territory of Hawaii. The rapid turnover and the mixed diagnoses placed limitations on the program, but the group psychotherapy seems to have been much more important than medication in the rehabilitation of these men.

PROCEDURE

During the month of August, 1945, 285 patients, — seamen, specialists, petty officers and chief petty officers, — with diagnoses including the fatigue states, the various neuroses, some hysterias, somnambulism, mild epilepsy and various personality disorders, spent an average of ten to fourteen days en route from front-line hospitals to the United States. Almost all of them knew that they were headed for a prolonged stay in the United States, if not for an actual medical discharge. The effect of the cessation of hostilities during the middle of the month did not improve their status, nor did it diminish their complaints. On the contrary, there was observed a generalized increase of tension and restlessness, even on non-neuropsychiatric wards, and indeed even among the staff members, including corpsmen, nurses and medical officers. The average daily census on the ward was 115, and the average daily attendance at conferences was 85.

After sick call every morning, during which every patient was seen and given an opportunity to express a complaint, exchange a friendly greeting or make an appointment for a private conference later in the morning, — frequently by request, if he appeared to be unusually worried or ill, — the patients were invited to gather at one end of the ward for an informal talk. An average daily attendance of 74 per cent of these patients attested to the fact that the invitation was welcomed by most of them. They participated vigorously in discussions that covered a wide variety of topics, and often lasted not only well past the allotted hour but sometimes for several successive days. The subjects included health, diagnoses, — medical and surgical as well as neuropsychiatric, — the causes and treatment of the neuroses, insomnia, disturbing dreams, courtship, marriage, insurance, educational opportunities and problems and the Red Cross services.

Nontechnical language, frequent interruptions for questions or comments, a blackboard and drawings, made by the patients themselves, and the presentation of actual case problems by the patients, usually anonymously, were the rule of the day. Occasionally a patient availed himself of the opportunity to leave the meeting whenever he chose to do so. A so-called "gripe box" was placed in the lobby, and its contents furnished the key to the particular day's discussions. Sample questions and comments are given below.

The average educational level of these men was the tenth grade. About two thirds of the group were married. Attendance on other duties, such as care of gear, special details, consultations and chapel attendance, cut down the average number of sessions attended to six, although many patients managed to be present at a dozen or more.

Some of the questions asked and comments made were as follows:

Could you explain the procedure that is followed when we return to the States? Do people think we are crazy, or what?

Does the pulse beat fewer times than the heart beats? If not, why doesn't it?

Please explain discrimination — not only of race but of color and creed — in the Service and in civilian life and between officers and enlisted men. Aren't some of us being a bit hasty in "judging other people's actions by our own"? To avoid any jumping at conclusions, the writer is white, of German-Dutch-English descent, a Mormon, and has spent quite a few years in both civilian life and in the Navy. Thank you for the help you have given all of us.

Suggest co-operative consideration among men in the Service. I believe this is a basic cause of a great deal of discontentment.

We have heard rumors that they send letters to our people stating that we are in the hospital, and we would like to know what they say if that is true.

What causes ulcers of the stomach, and can they be cured?

If a person in the family died with a cancer, is it possible for anyone else in the family to inherit one, and can they be cured?

How should one go about telling adopted children their status?

If you and your wife are nervous, will your child be nervous too — and what will be the cause?

Will you please explain the diagnosis of psychoneurosis anxiety, and if we are given a medical discharge will "PN" be stamped on our discharge?

Will duty in the Pacific have any effect on making a person sterile?

What's the cause of talking, walking and screaming in one's sleep? What is the cure for this condition?

Good morning,] Doctor. If a man has something on his mind concerning his wife and himself after they are married — something which she *should* know about — will you be so kind as to explain to the group a correct way to inform her about the trouble — the trouble being the couple can't have children — the male at fault, and in this certain case it is the female at fault.

These morning sessions are the bright spot of an otherwise drab routine.

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This article has been released for publication by the Division of Publications of the Bureau of Medicine and Surgery of the United States Navy. The opinions or assertions contained herein are the private ones of the writer and are not to be construed as official or reflecting the views of the Navy Department or the Naval Service at large.

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We want to put in a good word for the corpsmen. They are willing to co-operate and are helpful. They are a swell bunch of guys. We are leaving this morning and we thought we should let them know we appreciate all the kindness we received from them — and we also enjoyed your talks.

Is this publicity on the awful conditions in veterans' hospitals true, and if not why do they print such stuff?

Dear Doctor: I am a single man and I am deeply in love with a lovely lady back home. Doctor, I am getting up in age. I have had intercourse with this girl several times, and have never been able to satisfy her although we have tried again and again, but yet she still wants to marry me. Do you think it would be possible for us to have a happy married life?

Doctor: Would you try to clear this question for me. During the night I wake up a few times and each time when I awaken it takes me a good ten to thirty seconds to remember where I am at. When I am trying to remember where I am at it's like a nightmare.

Dear Doctor: At the present time I'm reading *A Tree Grows in Brooklyn* . . . and I was quite surprised when the author states that several of the women characters loathed the thought of sleeping with their husbands. I have been married several years and this came as quite a shock to me. Is this common in married life? Why do women stay with their husbands if they feel this way? The only thing I find wrong with your talks is the fact that they are not nearly long enough. I would like to sign this but don't want to be accused of "ear banging" so I'll just sign — "a patient, a fan and I feel as though I can say, a friend."

I have a problem which concerns myself as well as many others. This problem is of intermarriage. I am privately engaged to a Protestant girl and I am Jewish. I do love her very much, and vice versa. We are really in love, doctor, and the only thing preventing me from taking her hand in marriage is the matter of our children. . . . Her father is dead, but her mother is living and my folks are living. I do love her and after being away twenty-eight months I want to marry her. Please give us some help and suggest a way to bring up the children which would be easy for all concerned. We both believe in God and because we were born to different faiths shouldn't prevent us from marriage. What religion should we teach the children? Thank you in advance. Please give us assistance.

Dear Doctor: Is it possible for a homosexual person to control his emotions and lead an ordinary sex life or is he in that state mostly because he prefers to be? Is it true that intercourse after pregnancy can cause a person to be "homo" or are our reactions, likes and dislikes the reasons for homosexuality? Can a doctor help a person who sincerely wants to be helped, and what is the remedy?

Doctor, I have had a tachycardiac condition for the past year. My diagnosis is psychoneurosis anxiety. I would like to know how these two things are related and what I can do consciously to cure this ailment. During this year overexertion, excitement and stimulants have been the causes for reoccurrences of this heart condition. Should I leave these things alone or will each, in a proper amount, help me to effect a cure?

Dear Doctor: My wife has confessed to me that she has gone out with another man during my absence. She says that it was nothing serious, but for a couple of months her letters were cool and distant, although she did write practically every day. She says now she is sorry it ever happened and that she has learned her lesson. She now claims to love me more than ever. Would you speak to her of her "going out" upon returning home, or just forget about it and try to make the best of it? I love her very much.

Doctor: I have been in a melancholy state of mind for a year. What part does it play on the brain?

What makes you dream of killing people in your sleep? Is it because you hate someone very much? It always concerns me, and it wakes me up. It scares me an awful lot.

Dreams cause me to awaken with a tired and inner tumbling feeling. What can one do to suppress them? What is the nature and interpretation of a dream? Certain foods seem to be a cause, is that a foundation of fact, or a misconception?

Do worry and nervousness cause ulcers? Does continual irritation of ulcers develop into cancer? Is watching your diet the only way of healing ulcers? Does stomach trouble cause backaches?

Will you please tell us more about a hysteria neurosis — how it differs from other types of neurosis, why it is harder to overcome and whether it is acquired or hereditary?

At the morning talks I think we should talk about our future problems and what we will do when we are out of the Service instead of talking about women all the time. A lot of us are married and we don't believe our wives are running around, but drops of water on a stone will soon wear a hole.

Doctor: Best of luck and an early "gettin' home" to you and your staff. You have all shown a kindness and courtesy which is a credit to the Medical Corps and yourselves. The human treatment and the chance to express themselves openly or in the "gripe box" is as democratic as any procedure I have seen in the Navy. More power to you and your practice.

Dear Doctor: As you know, we had a talk on having food in the diet kitchen. The gripe before was about chiefs [chief petty officers] and corpsmen's eating steaks in the diet kitchen. Our gripe is who in the hell stole our two hot dogs from the refrigerator after we went through a lot of trouble swiping these dogs from the mess hall? As we are heavy eaters we have to have our snack before hitting the sack. Please inform the thief to keep his hands off our chow.

Dear Doctor: Tonite is my last nite here at the hospital or I should say school. Because it's been like a school to me. You've helped me a great deal since I've been a [pupil] here, not a patient. You've learned me a great deal about life that I never before knew. By your talks every morning and your smiles that you gave us all every morning at sick call and wherever you meet us. And believe me, Doctor, that smile did me more good than all the medicine anyone could give. I knew at times it was hard to smile, but nevertheless you did. I only hope that the fellows that may enter your school gain as much out of your talks as I have. God bless you always! Keep them smiling, Doctor!

Results

The following objective indications that the patients as a whole have derived considerable benefit from the program form the reason for presenting this article, as well as for continuing the talks.

Daily attendance has averaged 74 per cent. Even after the patients have been transferred to other wards because of crowding, many of them continue to return for the talks. Requests from patients on neighboring wards for permission to attend are frequently received.

At the close of the first week, the patients themselves requested a change of title for the "gripe box" on the ground that after the second day it ceased to contain any gripes. They have now adorned it with the following legends:

Worried? Curious? Troubled? Family trouble? "Dear John" letters? Leave a note for the doctor. Do you have a complaint or question you would like discussed? If so drop a note without your signature. Your medical officer will be glad to discuss any of these with the group each morning.

An unprecedented avalanche of requests for social service and legal assistance with personal problems descended on the local Red Cross department. These questions included illness and hardship at home, delayed news, financial problems and so forth. There was a sharp decrease in the number and frequency of requests to ward nurses and corpsmen for information — requests that often so dis-

rupted the working day that they interfered with routine chores. There was also a noticeable decrease in requests for private interviews with the doctor, as well as a change in the nature of these interviews. Just as the bulk of the questions in the complaint box became predominantly psychosomatic and sociomarital in content, so the bulk of the private consultations became sharply confined to specific problems instead of covering the generalized psychosomatic complaints that formerly predominated. This increased insight is illustrated by the following remarks: "I think I know what caused my headaches, now; but why do they keep coming back on me?" — "That talk you gave on the changes in the stomach and guts when you're scared — well, I guess that's me alright; but what am I scared of now?" — "You mean to say I keep blaming myself for sumpin' I didn't have the nerve to finish way back then?" "But Doc, I tell you I *do* love my father, I — well, yes, there *was* one time when I was pretty mad at him for something he did. . . . " A review of some of the questions in the preceding section also gives a fairly accurate picture of the depth of interest and understanding that has been cultivated in these men.

Although there is obviously no way of measuring the effectiveness of abbreviated individual psychotherapy, it seems to have increased. This is shown objectively in the conduct of the men on the wards, their ability to sleep without sedation and their heightened interest in recreational and occupational therapeutic pursuits. This is in sharp contrast to my experience with similar cases on open neuropsychiatric wards where there has been no such group psychotherapy.

Invitations to outsiders to serve as group leaders or as guest speakers have also increased as a direct result of the interest shown by the patients. These guests have included chaplains, Red Cross workers, specialists in education and returning ex-prisoners of war. Some of the specific contributions are presented below.

There has been observed by corpsmen, nurses and the doctors a sharp decrease in the number and frequency of requests by patients for the most frequently used medications — sedatives, cathartics and aspirin. For technical reasons this cannot be proved statistically, but that it is true is attested by the fact that the observation was made spontaneously.

One of the difficulties in obtaining a statistically accurate report of this decrease was the fact that peace came during the first month of this program. One would expect it to have operated as a favorable therapeutic influence, but the fact is that for the first two weeks after the cessation of hostilities there was observed a general feeling of being let down, accompanied by mounting tension and anxiety over the delay of demobilization. This was noticed among the non-neuropsychiatric patients as well, at times amounting even to actual friction and quarrels between patients and corpsmen. It was also easily discernible among the staff — the psychiatrists not excepted. Despite this, the demands for medication on this ward decreased.*

On one afternoon the irritability and restlessness of patients on two similar open neuropsychiatric wards reached unusual and in some cases almost hysterical proportions. The occasion was the announcement of an evacuation list on which some of the newly arrived patients had been placed, to the neglect of many of the earlier ones. The almost complete absence of such unrest on this ward was the result of a two-minute preliminary talk by the senior corpsman, a pharmacist's mate, second class. He explained that inequities and discrepancies often crept in, and that when a rush order came in for a quota to fill an unexpectedly available ship, some men whose records and disposition had been held up by requests for consultations or for laboratory studies, or on account of accumulations in the record office, might be delayed for a few days longer than others, but that in the long run the selections tended to balance up with reasonable fairness. So long as the patients knew that someone was taking an interest in them, that there was no intentional discrimination or neglect and that someone felt that they were important enough to deserve an explanation, they were reasonably satisfied. This conclusion is justified by the complete absence of complaints about the evacuation list in the complaint box on the following day. A few weeks later, with a new group of patients, when the preliminary talk had been unintentionally omitted, the box was again filled with protests over apparent inequities on the list.

The unsolicited reports of comments and discussions overheard among the patients that keep coming in from corpsmen, nurses and workers in other departments lend confirmation to the impression that the work is constructive. One observer said: "There was a complete absence of sensationalism, smirking or smut in their discussion of the question of whether the couple that had engaged in premarital intercourse should marry; and much of their discussion of intermarriage questions was on a distinctly highly intellectual plane."

Prisoners of War

In anticipation of the arrival of repatriated prisoners of war from Japan, it was the expectation of the psychiatrists at this hospital that not many psychotic or psychoneurotic patients would be encountered. This anticipation was fully realized.

One of the new arrivals, a pharmacist's mate, second class, was invited to meet with the group on the ward. In an informal way he presented a brief picture of some of his experiences during three and a

*On the closed neuropsychiatric wards there was observed during this same period a pronounced increase of depressed patients and of patients with deep anxieties over guilt, as well as of suicidal attempts.

half years as a prisoner of the Japanese. A few of his observations are given as a requisite to understanding the reaction of the neuropsychiatric patients to his story.

Out of about 3500 sick patients — all prisoners of war and most of them Americans — he recalled less than 50 who were neuropsychiatric casualties. The bulk of these were psychotic, and all were given the so-called "cage treatment," which was literal incarceration in an open cage, usually without clothing, with an inadequate supply of food, with no medication whatsoever and with frequently repeated abuse, violence, torment and torture — chiefly beatings, wettings and freezing. Even the vermin-infested mats were denied them for bedding, and they were often deprived of the half-rations usually accorded to other sick patients. When they died, the other patients were forced to stand by and watch their cremation, as a warning not to die — (sick prisoners cannot build airfields, and half-rations are no inducement to remain on the sick list). A temperature of 103°F. or higher was required for admission to the sick list. A Japanese "doctor" performed alleged appendectomies without anesthetics (Red Cross supplies were unobtainable because they were needed to fill the black-market demand), and experimented with beriberi and other diseases by injecting intravenously aqueous solutions of whole soy bean preparations. The death of 8 of these unfortunate victims in succession did not deter his "research." The worst psychotic patient the soldier recalled was a homicidal maniac who was convinced that men were bent on killing him. He stood the cage treatment for six weeks, after which he returned to his duties, remaining cured from then on.

"Could you tell us," I asked the speaker, "whether you had many psychoneuroses, and approximately how many and what type?" He shook his head with a sad smile, and said, "They were too sick." Spontaneously his audience of 120 patients burst into honest and uncontrolled laughter.

Evidence of the protracted effects of the group talks can be seen from the following abbreviated reconstructive analyses.

Case 1. A seaman, first class, with a ninth-grade education, who had been away from home for 2 months, for the first time, was admitted to the sick bay for nostalgia and an anxiety neurosis. After attending seven ward talks, he asked for help in regard to a lump in his throat that had suddenly appeared 3 nights previously.

The patient could think of nothing unusual that had occurred during the day of onset, but readily admitted that a lump in one's throat frequently denoted grief. He laughed at the suggestion that he might be thinking that someone was trying to choke him, and was equally certain that he had no organic disease in his throat.

On the day of onset, the patient had seen the moving picture "Wells Fargo." The scenes that he remembered were those in which the hero's mother-in-law salvaged the note written by her daughter and sent it to the Confederate enemy, causing the ambush and near death of her son-in-law. The patient had been keeping company with a young girl for several years. He was sure that her mother would object to an early marriage, and was reluctant to admit that the reason he had not mentioned the existence of this girl to his mother was that he feared that she too would oppose the union. He realized that, unlike the hero in "Wells Fargo," a pioneer of the transcontinental delivery service, he was not returning as a hero, but that like him he was returning to a home of ever increasing value. He readily accepted the analogy that just as a problem in arithmetic might have several different answers, all of them correct, so there must be many factors contributing to his neurosis. Before the close of the half-hour interview he was able to apply this reasoning to two other functional complaints — pains in the region of the left breast and speeding up of the heart. His associations were as simple as they were obvious — "heart panic" or "heart ache." He did not know that heart failure was such a frequent cause of death, so that this phase of the interview was not pursued. He dwelt a little more on "heart throb," and left in a smiling and greatly relieved mood. Two weeks later his complaints had not returned, and his clinical status had greatly improved, notwithstanding the delay in his evacuation.

Case 2. A 22-year-old, unmarried aviation mechanic, who was gaunt and underweight and appeared to be harassed, with a diagnosis of hysteria kept insisting that the pains in his perineum must be organic, and that even though the vertebral x-ray films and prostatic smears were negative, the only treatment that had given him any relief was the prostatic massages he had received a few weeks previously. He had had 14 years of schooling.

During the initial examination he was asked whether the term "a pain in the ass" meant anything in particular to him. His response was a spontaneous grin, and he agreed to think over possible associations pending his next interview.

Several days later, and after repeated denials, the patient recalled his first experience of perineal distress. This and succeeding associations during four sessions of 20 minutes each, were as follows: At the age of 15 he visited a hospital where a favorite brother-in-law was recovering from serious mutilating injuries. On entering the hospital he experienced sharp distress in the perineum. The present complaint was similar but more accentuated. He had the same sensation whenever he visited a hospital if he saw anyone who was badly injured. He continued: "About ten days ago at a picnic I was O. K. until it came time to come back [to the hospital]. Then it suddenly came back in the bus — I remember seeing a sign, 'Don't throw cigarette *butts* on the deck.' Yeah, I do sometimes call it my 'butt.'" During his earlier period of hospitalization he had had to receive rectal tubes for relief of abdominal distention; the relief was pleasant, and eased his perineal distress. The use of the tube recalled his fear of hemorrhoids — from his straining at stool — and his buddies, who had had to have hemorrhoidectomies for painful and bleeding piles about a year previously, at the time of the onset of the present illness. His mother has used an enema daily, and she had not slept with his father for as long as he could remember. Once when drunk he thought that he had accomplished anal intercourse with his mistress, and had been ashamed of this ever since.

On the occasion of the last interview, at which these associations were uncovered, the patient entered smiling and demanded to be returned to duty on the ground that he had recovered. He was advised to take a few months at a convalescent hospital first. He stated that he began to "catch on" after the seventh group lecture — especially after the talk on constipation. On that day he stopped straining in order to test himself for the presence of the pain and suddenly discovered that it had left him. Except for two transient returns following sports, he has remained symptom-free for 3 weeks, for the first time in 11 months.

Case 3. A 27-year-old, married carpenter's mate with an eighth-grade education had had 11 months of active duty, 7 of them overseas. The diagnosis was anxiety psychoneurosis. After his fifth session on the ward, he asked about a disturbing dream that had occurred on three successive nights a month earlier, causing him to awaken in a tense and anxious state. In the dream a strange man was entering his home in the United States and either kidnapping or killing his baby and assaulting his wife.

For over 10 minutes the patient insisted that he could think of no association, but he finally reluctantly stated that his brother had been unfaithful to his wife and had been caught and forgiven. The patient greatly admired his sister-in-law and felt her wrongs deeply. On the next interview he reported an affair of his own with a former sweetheart and his fear lest his wife should discover it and leave him. One week later he came in to report considerable anxiety over a photograph of himself that he had impulsively sent to the girl friend with an affectionate caption. The picture was sent in June. He regretted sending it at once and requested its return a few days later. An answer was expected in July, but none had yet arrived. The patient reported at the sick bay with his anxiety psychoneurosis on July 15.

It was suggested that even if the unlikely did happen and his wife heard about the episode or saw the picture, there were after all many other things that he had done in June that he did not remember. Apparently the idea of pleading amnesia, together with error, appealed to him, although he rejected it strongly, for 3 days later he reported: "I've been sleeping sound the last few days with all the racket — the boys tell me we had a rumpus during the night but I never even heard it." From his account it seemed probable that the picture had been destroyed or would be returned when his mail caught up with him. Insight into the causes of his dream and his bipolar affection for his sister-in-law, together with his exaggerated fear of losing his wife, seems to have been the chief cause of his improvement, which persisted clinically for the rest of his stay of 3½ weeks.

There have been dozens of cases with similar problems, affecting chiefly sleep and functioning of the gastrointestinal tract, that have shown striking improvement, if not recovery, over extremely brief periods of time. Since this improvement occurs in men with a history of continued complaints for months and sometimes years, it is believed that, contrary to popular opinion, it is not necessary to undergo prolonged psychoanalysis or to have a superior education to profit from concentrated psychotherapy.

Discussion

In view of the natural limitations of analytical, hypnotic and narcotherapeutic procedures, and because of the large turnover of borderline neuropsychiatric casualties in this hospital, an attempt has been made to apply the well known principles of group therapy on a somewhat larger scale than has usually been reported.[1, 2]

As was pointed out in a previous paper, there is ample Biblical precedent for the principles of mental hygiene in group therapy.[3] The following excerpts from the "Book of Proverbs" bear repetition:

A wise man is strong — by wise counsel thou shalt make thy war; and in multitude of counselors there is safety (*24*:5–6).

Debate thy cause with thy neighbor himself (*25*:9).

A scorner seeketh wisdom, and findeth it not (*14*:6).

He that answereth a matter before he heareth it, it is folly and shame unto him (*18*:13).

A merry heart doeth good like a medicine [and] maketh a cheerful countenance (*17*:22; *15*:13).

A man that hath friends must show himself friendly; and there is a friend that sticketh closer than a brother (*18*:24).

Chasten thy son while there is hope, and let not thy soul spare for his crying (*19*:18).

Labor not to be rich (*23*:4).

A good name is rather to be chosen than silver or gold (*23*:1).

Withhold not correction from the child; for if thou beatest him with a rod, he shall not die (*23*:13).

A man's gift maketh room for him, and bringeth him before great men (*18*:16).

A brother offended is harder to be won than a strong city; and their contentions are like the bars of a castle (*18*:19).

It is better to dwell in the wilderness than with a contentious and an angry woman (*21*:19).

These and similar proverbs, one of which was posted each day on the bulletin board, gave both strength and dignity to our discussions of the commonly accepted teachings of mental hygiene. The majority of the men appear to have learned in an average of half a dozen sessions that a diagnosis of psychoneurosis is not a permanent stigma, that it is a valuable safety valve, and that as such it is a promising and constructive key to a better understanding of their personalities. They readily grasped the idea that any organ may act as a safety valve, and that when the valve was released through a functional disorder — that is, when a neurosis appeared, — three facts were immediately known both to the patient and to the doctor: first, that the inside (emotional) pressure was too great; second, that the valve was functioning normally; and third, that the boiler — the body and brain — was being saved from immediate damage.

A gratifyingly large number of men have reported, without solicitation, that they have noticed a pronounced improvement in health even without follow-up interviews, and often even before they learned of their disposition (evacuation to the United States). Ten patients during the month of August made a sincere request to be returned to duty on the ground that they had fully recovered.

It may be re-emphasized that a great deal of the success of the program is in large measure dependent on the initial interview, in which each patient is given a brief but adequate neurologic and psychiatric examination and an appraisal is made independently of the data contained in his health record.[4]

Conclusions

The dignity of human companionship and free discussion as a daily accompaniment of the rehabilitation program is a proved and valuable adjunct to physical, medical, occupational and recreational therapy. The nature of the questions and discussions is excellent proof of the earnest desire of most psychoneurotic patients to understand their problems and to do something constructive about them. Limitations of intelligence and education do not seem to be a barrier to the execution of such a program. Much depends on the group leader, but almost any person, whatever his profession, may start such a program if he understands the dynamics of human behavior and maintains a sympathetic attitude toward psychosomatic problems. For such subjects as he may not feel qualified to discuss there will always be experts who will be willing to contribute what they can. For patients of any class it is important that they shall feel that their emotional and personal problems are just as much in need of study and guidance as are their physical and organic

problems. Lecturers, teachers and clergymen of all denominations are learning that their most popular meetings are those in which they give to their respective fields a liberal and human interpretation. Many of these leaders have been conducting group psychotherapy for centuries. Much more of this sort of "treatment" is needed.

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MEDICAL PROGRESS

OPHTHALMOLOGY

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IN the past year there have been no outstanding advances in ophthalmology. Two subjects, however, have been selected on the basis of general interest.

PENICILLIN IN OCULAR INFECTIONS

Enough time has elapsed since the introduction of penicillin to evaluate its efficiency in treating diseases of the eye. The literature abounds with case reports of alleged cures, but in many of these the penicillin has been used along with sulfonamides and other drugs, so that its true therapeutic role is difficult to determine. One fact, however, stands out clearly: penicillin is usually superior to the sulfonamides for several reasons. It is generally nontoxic, whatever route of administration is chosen[1]; its antibacterial action is not inhibited by autolytic products and secretions[2]; it has little if any deleterious effects on the regeneration of corneal epithelium[3]; and it is not incompatible with other frequently used drugs, such as atropine, cocaine, procaine and sulfadiazine.[4, 5] With these advantages it should be the drug of choice in treating any ocular infection known to be due to penicillin-sensitive organisms. Unless, however, certain basic facts are understood regarding its distribution in the ocular tissues by various methods of administration, many cases will not be treated effectively, and much valuable time will be lost before the ocular infection can be brought under control.

In 1944, Struble and Bellows,[6] using rabbits and dogs, showed that when penicillin was injected intravenously in large amounts it was concentrated in the ocular tissues as follows, in descending order: the extraocular muscles, the conjunctiva, the sclera, the chorioretinal tissue and aqueous. Only a trace was found in the cornea and vitreous, and none was found in the lens. When, however, penicillin was applied locally by corneal bath, a much higher concentration was found in the conjunctiva, sclera, iris and aqueous than when it was given either intravenously or subconjunctivally.[7]

The same year, von Sallmann and Meyer[8] showed that repeated instillations of penicillin solution or ointment in the eyes of rabbits produced no detectable antibacterial activity on the part of the aqueous, even with the addition of wetting agents, which usually enhance the passage of various substances through the cornea. A corneal bath, however, resulted in high levels in the aqueous. These investigators also found that by iontophoresis the penicillin passed easily into the aqueous, the latter exhibiting an antibacterial activity for four hours after a single application. The amount recoverable in the aqueous by this method was calculated as being ten times greater than that by the corneal-bath technic.

Leopold and LaMotte[3] also showed that local instillations were ineffective in getting penicillin into the aqueous of normal rabbits' eyes; on the other hand, this simple method worked quite well when the corneas were abraded or if experimental corneal ulcers had been produced beforehand. The concentrations in the aqueous in these inflamed eyes were well above the required therapeutic level, as defined by Rammelkamp and Keefer,[9] who state that the concentration in serum required for maximum bacteriostatic effect is 0.019 units per cubic centimeter for *Streptococcus haemolyticus* and 0.15 units for staphylococcus. These authors therefore concluded that the elaborate iontophoretic technic was probably unnecessary in dealing with infected corneas when simple instillations appeared to be adequate.

Apparently intramuscular injections also fail to produce any appreciable concentration of penicillin in the aqueous of normal rabbits, but they may do so when corneal ulcers have been produced beforehand.[3, 8, 10]

The application under the lid of a small cotton pack saturated with a solution of penicillin containing 20,000 units per cubic centimeter has been

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shown by von Sallmann[11] to be extremely effective in producing high concentrations in the aqueous, cornea and iris.

The intravitreal penetration of penicillin has been the subject of much experimental work. According to Leopold,[12] intramuscular and intravenous injections of as much as 4000 units per kilogram of body weight have failed to produce detectable concentrations in the vitreous of normal rabbits. The results following subconjunctival injections have not been uniform, one investigator[12] finding fair levels of penicillin in the vitreous of normal rabbits' eyes and others[8] finding extremely inadequate levels.

The results of these various investigations on normal eyes can now be correlated with some of the experiments designed to test the efficacy of penicillin in combating experimental infection.

Robson and Scott[13] successfully treated experimentally produced staphylococcal ulcers on the corneas of rabbits by frequent instillations of a penicillin solution consisting of 500 units per cubic centimeter.

Using rabbits, von Sallmann,[14] by introducing 0.05 cc. of a diluted broth culture of pneumococcus (Type 3, 7 or 10) into the anterior chamber, produced a standard infection with simultaneous injury to the lens. Treatment by penicillin iontophoresis was begun six and twelve hours later and was continued for two or three days. The infection was checked in all cases, even after twelve hours, whereas the eyes of the control animals went on to destruction.

Von Sallmann[15] repeated the same experiments using various strains of penicillin-sensitive staphylococci. Penicillin applied by iontophoresis six hours after inoculation controlled the infection in 62 per cent of the eyes so treated. An intralenticular injection of *Clostridium welchii* caused a destructive endophthalmitis, which was not influenced by penicillin therapy.

Direct injection of 0.1 cc. of penicillin solution —2500 units per cubic centimeter — into the anterior chamber of the normal rabbit's eye has been shown by Dunnington and von Sallmann[16] to be relatively harmless, but more than this may cause serious damage. This method has been made use of by Scobee,[17] who produced perforating corneal injury in a number of rabbits and then infected the anterior chambers with hemolytic *Staphylococcus aureus*. A solution of penicillin containing 500 units per cubic centimeter was then introduced into the anterior chambers on successive days, but this succeeded in controlling only the mild infections, the severer ones not being affected.

Town, Frisbee and Wisda[18] were able to cure experimental streptococcal infection of the anterior chamber of rabbits' eyes by massive doses of penicillin given intramuscularly, provided no injury to the lens had taken place. They point out that in infections of the anterior chamber a direct injection of penicillin following a withdrawal of aqueous may be dangerous owing to extension of the infection at the site of the needle puncture.

Von Sallmann and his associates[19, 20] have shown that the normal rabbit's eye tolerates a direct intravitreal injection of 500 units of penicillin. More than one injection or the giving of more than 500 units in a single one may cause serious damage. Since others[10–12] have shown that intravenous injections, subconjunctival injections, iontophoresis and application of saturated cotton packs all fail to produce more than traces of penicillin in the vitreous, von Sallmann[20] tried intravitreal injections in experimentally produced vitreous infections of rabbits' eyes. Each of ten eyes received 0.05 cc. of a diluted broth culture of a Type 3 pneumococcus introduced directly into the center of the vitreous. Treatment was begun eight hours later by an intravitreal injection of 0.1 cc. of penicillin containing 100 units. All ten eyes recovered completely. The same intravitreal injection was found equally efficacious in staphylococcal infections of the vitreous, in which even 10 units of penicillin checked the infection in all ten eyes. The therapeutic effect was, however, greatly enhanced when a dose of 400 units was injected. Leopold[12] also found that experimental staphylococcal infections of the vitreous of rabbits could be halted by an intravitreal injection of 500 units of penicillin.

Subconjunctival injections of penicillin have been found totally ineffective against experimental pneumococcal infection of the vitreous in rabbits by von Sallmann[20] and only partially effective against staphylococcal infection by Leopold.[12] Likewise, intravenously administered penicillin has failed to halt experimental vitreous infection in rabbits.

It must be borne in mind that conclusions reached from experiments on animals' eyes do not necessarily apply to human eyes. It is therefore necessary to examine carefully some of the few human experiments available. One of the first of these was made by Rycroft,[4] a medical officer in the British Eighth Army in Africa. Shortly after death he removed five normal eyes from 5 soldiers who had been receiving large amounts of penicillin intramuscularly. Penicillin assays were carried out on the aqueous and vitreous, but no inhibition of bacterial growth could be detected. These determinations, however, were made six hours after death and fourteen hours after the last administration of penicillin, so that one might not expect any results. Rycroft then removed seven badly damaged eyes from soldiers receiving large doses of penicillin intramuscularly. In these cases the last dose of penicillin had been given within three hours, but even here no detectable amounts could be found in the aqueous or vitreous. It thus appears that although intramuscular injection may be effective in the case of damaged rabbits' eyes, it is not necessarily so in damaged human eyes.

Rycroft[21] also reported some experimental work with subconjunctival injections of penicillin in human eyes. Ten eyes hopelessly blind and scheduled for removal were given subconjunctival injections of 0.25 cc. of a solution of penicillin containing 4000 units per cubic centimeter. After intervals of fifteen, thirty and sixty minutes, aspiration of 0.12 cc. of either aqueous or vitreous was performed. It was found that penicillin reached the aqueous after fifteen minutes in 7 of 8 cases. Three of 6 cases showed penicillin in the vitreous after forty-five minutes.

Quantitative determinations on human eyes were made by von Sallmann.[11] He selected four eyes about to be enucleated for various conditions—two for malignant melanomas near the disk, one for absolute glaucoma and one for an old injury from an intraocular foreign body. In three eyes he inserted under the lid cotton packs soaked with a solution of penicillin containing 20,000 units per cubic centimeter for one hour. Aqueous determinations showed 2.3 units of penicillin in one case of melanoma and zero units in the other. In the case of absolute glaucoma 9 units per cubic centimeter was found. In the remaining eye, that with the old injury, 4 drops of a solution of penicillin containing 20,000 units per cubic centimeter were instilled and the eye was enucleated two hours later. The aqueous contained 0.5 units per cubic centimeter. Hence, observations on human eyes have been erratic, but generally speaking the average amount of penicillin found in the aqueous is much less than that found in rabbits' eyes.

The weight of experimental evidence indicates the following recommendations for treating eyes infected with penicillin-sensitive organisms. First, intramuscular and intravenous injections of penicillin probably have little effect in controlling infections of the anterior and vitreous chambers. Second, subconjunctival injections may have some effect on infections of the anterior chamber but are probably worthless in infections of the vitreous. Third, infections of the vitreous can probably be most effectively treated by a single intravitreal injection of 0.1 cc. of penicillin solution containing not more than 500 units. Fourth, infections of the anterior chamber are likely to be controlled by local application of saturated cotton packs or by iontophoresis. Corneal bath and subconjunctival injection will probably be less effective. In cases of perforating corneal injury with damage to the lens, a single injection of 0.1 cc. of a solution of penicillin containing not more than 500 units may be justified. Lastly, for conjunctivitis and infected corneal ulcers, frequent instillations of penicillin drops or ointment will probably be effective. Saturated cotton packs under the lids, iontophoresis or corneal bath should be tried in extremely severe cases.

So much for the experimental work. Case reports of the clinical use of penicillin fill the literature. The most striking ones deal with cures of gonorrheal conjunctivitis.[22–25] Apparently this disease may be effectively treated either by frequent local instillations or by intramuscular injections alone, since the original work of Struble and Bellows[6] showed that systemic treatment resulted in high concentrations in the conjunctiva. When the cornea is involved, however, it seems wise to use local applications in addition to intramuscular or intravenous injections.

Although no definite dosage or frequency of application has been determined for surface infections, the tendency has been toward higher concentrations and more frequent applications. Thus, Sorsby and Hoffa[26] report 47 cases of ophthalmia neonatorum, most of them due to the gonococcus, in which the best results were obtained by using penicillin drops (2500 units per cubic centimeter) every thirty minutes for the first three hours, every hour for the next twenty-four hours, and every two hours for the next two days. Under this regime 21 of 22 cases received a complete clinical cure within one hundred hours. In other groups of cases treated with lower concentrations and less frequent applications, no such high percentage of cures was obtained.

Marginal blepharitis appears to be a condition in which penicillin can be of great value. The usual procedure is to rub penicillin ointment containing 1000 units per gram into the lid margins three times daily. Florey, McFarlan and Mann[27] report 48 cases treated in this manner. Cure was complete in three to ten weeks, no other treatment being used. A follow-up of these patients after a year without treatment showed that 66 per cent remained free from recurrences.

Orbital cellulitis has been successfully treated by Sloane[28] with the use of intramuscular injections.

The reports of the treatment of corneal ulcers are encouraging. Juler and Young[29] and Cashell[30] report series in which a rapid cure was obtained in the great majority of cases by frequent instillation of penicillin drops containing 500 units per cubic centimeter.

There have been several favorable reports[31–35] on the direct injection of penicillin into the anterior chamber for infections following perforating injuries. In some cases dramatic improvement has taken place after all other methods aimed at the control of the infection have failed. A single injection of 100 units has usually been sufficient.

No reports on intravitreal injections in the human eye have appeared in the literature, but on the basis of experimental work it seems justifiable to employ them in certain cases of vitreous abscess after perforating injuries. One should be careful to limit the injection to 0.1 cc. containing 250 units and to place the injected fluid as near as possible to the center of the vitreous, so that little if any contact is made with the retina.

The results of penicillin therapy in nonspecific uveitis have been disappointing, although occasionally favorable results have been reported. The most complete report on this subject is that of Irvine and his associates,[36] who treated 56 cases of all types of uveitis with intramuscular injections of penicillin and 8 additional cases by penicillin iontophoresis. Only in 9 cases of iridocyclitis was any significant improvement noted, and this was said to be no greater than would have been expected from the usual forms of therapy.

Syphilitic uveitis may be expected to respond to penicillin, and such has been found to be the case in the report of Klauder and Dublin[37] of 3 cases treated with large doses intramuscularly.

According to Darius,[38] trachoma has responded favorably to penicillin instillations, but the improvement observed was said to be in no way better or more rapid than that seen with sulfonamides.

The treatment of dacryocystitis has not been satisfactory. Bellows[2] states that the discharge becomes sterile but no clinical recovery takes place.

In cases in which doubt exists concerning the nature of the infecting organism, there is no reason why the sulfonamides may not be employed along with penicillin. Although it has been shown that no incompatibility exists between the two drugs, either in vitro[4] or in vivo,[39] experimental work indicates that the effect of one does not enhance that of the other.[39]

Sensitivity of the ocular tissues to penicillin has been occasionally reported.[5, 40–42] This usually occurs in the form of redness and swelling of the lids, although some cases of generalized urticaria have been seen.

Retrolental Fibroplasia

Persistence of the embryonic blood supply of the lens, the tunica vasculosa lentis, is occasionally seen in full-term infants.[44–48] It is usually unilateral and has been regarded as a purely local disturbance. What appears to be another phase of this disease is a progressive growth of opaque embryonic tissue behind the lens, which occurs, usually bilaterally, in a number of premature infants after birth. The nature and prevalence of this condition are just beginning to be understood, largely through the work of Terry,[49–55] who has given it the name of "retrolental fibroplasia."

The syndrome consists of widespread ocular changes related to persistence of the hyaloid artery and tunica vasculosa lentis, to growth of embryonic connective tissue behind the lens and to persistence of the fetal fibrillar vitreous. The typical changes are shallow anterior chambers, microthalmia, a fetal-blue color of the iris, searching nystagmus and often retinal separation. Glaucoma and cataract may also occur, and spontaneous hemorrhage into the anterior chamber of vitreous has been reported.[56] The condition has sometimes been mistaken for retinablastoma.[57–61]

The incidence of this condition is apparently increasing, probably owing to the greater survival rate of premature infants during the last decade. Clifford[62] of the Boston Lying-in Hospital found that 12 per cent of infants weighing 3 pounds or less at birth developed this disease. Terry,[55] using this figure along with statistics compiled by the Children's Bureau of the United States Department of Labor on the annual survival rate of 3600 extremely premature infants, has estimated that a minimum of 432 will be blinded by this cause yearly.

How this condition is brought about is the subject of much speculation. Normally the tunica vasculosa lentis consists of a network of blood vessels surrounding the lens.[63] The parent vessel of this system is the hyaloid artery. Venous drainage takes place through the pupillary portion of the tunica, the so-called "pupillary membrane," to the anterior surface of the iris. This whole system is designed to nourish the lens at a stage when the aqueous humor has not yet formed. After the ciliary body begins to produce aqueous, the lens has a new source of nutrition and the need for this elaborate vascular system ceases. Normally at eight and a half months the hyaloid system ceases to carry blood.[63]

Although there is no direct proof of any one of the many possible causes for persistence and overgrowth of the embryonic vascular system, the most tenable theory, according to Terry,[53] is the effect of precocious exposure to light in these premature infants. This activates the musculature of the iris before the disappearance of the hyaloid vascular system. The resulting disturbance of the blood supply of this region may prevent aqueous from being formed. This in turn leaves the crystalline lens dependent on the hyaloid artery and tunica vasculosa lentis, and thus this embryonic vascular system persists, instead of regressing.

Terry has stressed the fact that retrolental fibroplasia is more than a persistence of the tunica vasculosa lentis, which consists only of blood vessels and contains no connective tissue. The condition under discussion has as its prominent feature an actual overgrowth of embryonic connective tissue, which, Terry believes, takes place to furnish support for an abnormally developed vascular system. Some of his reported cases have not shown this abnormal hyperplasia until some weeks or months after birth.

Unsuccessful attempts have been made to reproduce the disease in animals whose eyes at birth are extremely underdeveloped, such as the rat and the opossum.

A slightly different viewpoint regarding the development of this condition is held by Reese and Payne,[56] who have recently reported 50 cases. They believe that the retrolental fibroplasia occurs before birth and is chiefly due to persistence of the primary vitreous, which is vascularized mesoderm. This mesoderm may undergo either progressive or regres-

sive changes. Normally it disappears toward the end of fetal life, but occasionally it persists and forms firm connective tissue in back of the lens.[64] In the 50 cases reported, 30 infants were premature and 20 were full term. Of the premature infants, 28 showed bilateral involvement and 2 unilateral involvement. Of the full-term infants, the involvement was bilateral in 7 and unilateral in 13. Thus, 35 of the 50 cases were bilateral and 15 were unilateral.

Reese and Payne believe that the same factor that precipitates early birth may also cause the eye lesions. Although no convincing evidence is presented, the authors think that maternal infection may be a factor. A history of uterine bleeding was obtained in 12 of the mothers in their series. Maternal infection is known to cause congenital anomalies in the offspring, as has been shown in the connection between rubella during pregnancy and congenital cataracts.[65]

So far as treatment is concerned, many suggestions have been made. If one accepts the theory of the deleterious effect of light, these premature infants should be kept in a dark room for some weeks as a prophylactic measure. Mydriatics may be used not only to put the iris at rest but also to break up posterior synechiae, which often occur.[55] Miotics may have to be used in the cases in which glaucoma develops.

Attempts to seal off the hyaloid artery with diathermy have been unsuccessful.[50] Operations designed to establish new vascular connection between the episcleral vessels outside the eye with the ciliary body are of doubtful value.[53] Surgical attempts to remove the lens substance and make a vertical cut in the retrolental tissue have resulted in varying degrees of success.[54] Irradiation has been suggested as a likely means of closing the blood vessels in the fibroblastic tissue.[56] In a few cases partial retrogression of the opaque connective tissue behind the lens has been observed without any treatment, but the eyes have never developed normally.

243 Charles Street

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MASSACHUSETTS MEDICAL SOCIETY

PROCEEDINGS OF THE COUNCIL

Special Meeting, April 10, 1946

THE Council of the Massachusetts Medical Society met in special session on Wednesday, April 10, 1946, in Building E, Harvard Medical School, Longwood Avenue, Boston. The meeting was called to order by the president, Dr. Reginald Fitz, at 10:30 a.m. Dr. Michael A. Tighe served as secretary. One hundred and forty-four councilors were present (Appendix 1).

In opening the meeting Dr. Fitz stated that the Council had not met in Harvard Medical School since 1825. He added that before that date it had met in this school several times. He said that this gave a certain historic interest to the meeting.

He introduced Dr. C. Sidney Burwell, dean of Harvard Medical School, who spoke of the close relation that existed between the Massachusetts Medical Society and Harvard Medical School in the infancy of both and who added that, in their maturity, they were still not very far apart. Dr. Burwell graciously welcomed the councilors and asked them to come again.

The business before this meeting was the report of a special committee, which had been appointed to confer with Major General Hawley, medical director of the Veterans Administration, concerning the medical care of veterans by civilian physicians.

The report of this committee presented by Dr. Humphrey L. McCarthy, Norfolk, chairman, as amended by the Council, is as follows:

> On February 6, 1946, the appointment of the Special Committee on Veterans' Care, comprising J. J. Dumphy, Worcester, H. L. McCarthy, Norfolk, and M. A. Tighe, Middlesex North, was formally confirmed by vote of the Council. This committee had been appointed in January by the President as a matter of emergency and at the request of Major General P. R. Hawley, of the Veterans Administration in Washington, who asked for a committee from the Society to confer with him about the medical care of veterans in Massachusetts.
>
> Throughout its work, this committee has steadfastly borne in mind the Council's belief that the most satisfactory and economical care of veterans in Massachusetts could be obtained by granting them free choice of physicians in their own communities, this service to be paid for at prevailing rates, and, if hospitalization were required, by granting them hospitalization privileges in local licensed hospitals of their own choice.
>
> Here is reported the committee's actions.
>
> On January 14, 1946, the committee went to Washington to meet with General Hawley's representative. We were informed that the Veterans Administration favored the local care of veterans along the lines approved by the Council. Up to that time, two types of contract to meet this general aim had been established; one with the Michigan Medical Service and another with the Kansas Medical Society.
>
> Under the Michigan plan, doctors affiliated with the Michigan Medical Service who wished to take care of veterans were to be paid according to an agreed fee schedule through the Michigan Medical Service, which in turn was to be paid by the Veterans Administration. The Michigan Medical Service was to collect the amount to be paid for professional care plus 7 per cent, the latter sum representing the estimated costs necessary to the administration of such a plan.
>
> The Kansas plan entailed the Society's submitting a list of its members who desired to work for the Veterans Administration under an established fee schedule. The society was to zone the state in an appropriate manner; offices of the Veterans Administration were to be established where needed and were to administer the plan directly.
>
> Under either plan, a fee schedule was required. Therefore, the committee was informed that a fee schedule acceptable to participating doctors in Massachusetts was the first step in the development of any plan for veterans' care in this region outside that offered in veterans' hospitals.
>
> We have constructed a fee schedule, which has been built up as fairly as possible, and in our judgment represents an honest appraisal of charges prevailing among Massachusetts practitioners for the services listed. The figures were obtained by consultation with individual physicians, with groups of physicians in different parts of the Commonwealth, and from representatives of the various specialty boards and special societies who happen to be residents of the Commonwealth.
>
> We recommend the adoption by the Massachusetts Medical Society of this fee schedule as the first step in the activation of a plan for offering Massachusetts veterans optimum medical care by civilian physicians and in civilian hospitals.
>
> We were given to understand that contractual arrangements might be established between the Veterans Administration and the Blue Cross–Blue Shield, whereby the hospital expenses of veterans in civilian hospitals would be met by the Blue Cross as agent and whereby the costs of professional services of civilian physicians caring for veterans under the fee schedule would be met by the Blue Shield as agent.
>
> We believe that this plan is preferable to the Kansas plan and recommend its adoption. We have consulted with both the Blue Cross and the Blue Shield and have been informed that they are willing to undertake its administration. The Blue Shield agrees that an 8 per cent charge for expenses of administration is reasonable.
>
> Should the Council adopt the plan thus outlined, we believe that the next step is for our attorneys and the attorneys of the Blue Cross and the Blue Shield to frame a contract acceptable to the three organizations involved. We recommend that final approval of any such contract as it concerns the Massachusetts Medical Society should be delegated to the Executive Committee.
>
> Such a contract in its final form should then be presented to the proper authorities. It would represent the

views of the Massachusetts Medical Society regarding how to afford our own veterans the best of medical care outside of veterans' hospitals.

We believe that when such a contract is under consideration there should be at hand one or more duly appointed representatives of the Massachusetts Medical Society empowered to approve any minor changes in the fee schedule that might prove advantageous.

As part of his committee's report Dr. McCarthy submitted a schedule of fees for medical services rendered under the Veterans Administration Medical Care Program. This schedule, as amended by the Council, is given in Appendix No. 2. In moving the acceptance of the report, he said that each member of the Council had received it well in advance of the meeting. The motion to accept the report was seconded by Dr. Peirce H. Leavitt, Plymouth, and it was so ordered by vote of the Council.

Dr. Albert A. Hornor, Suffolk, moved that the Council go into executive session. This motion was seconded by Dr. Elmer S. Bagnall, Essex North, and it was so ordered by vote of the Council.

At this point in the meeting the Council went into executive session.

At 5:30 p.m. Dr. Daniel B. Reardon, Norfolk South, moved that the Council rise out of executive session. This motion was seconded by Dr. Leavitt, and it was so ordered by vote of the Council.

The President announced that the Council had risen out of executive session.

It was moved by Dr. Leavitt and seconded by Dr. Charles C. Lund, Suffolk, that the Council adopt the part of the committee's report dealing with the fee schedule as amended by the Council, with the understanding that any contract that concerns this fee schedule would be reviewed by the Massachusetts Medical Society within a year.

In the debate attending this motion, it was explained by Dr. McCarthy that the duration of any contract that the Blue Shield as administrator entered into with the Veterans Administration would be for one year and that, at the end of six months, either of the signatories might make suggestions regarding its revision.

The motion was adopted by vote of the Council.

It was moved by Dr. McCarthy and seconded by Dr. Reardon, that the Council approve of the plans whereby the hospital expenses of veterans who are being cared for in civilian hospitals be met by the Blue Cross, acting as administrative agent of the Veterans Administration, and whereby the costs of professional services of civilian physicians, who are caring for veterans under the fee schedule adopted be met by the Blue Shield, acting as administrative agent of the Veterans Administration.

In the debate attending this subject, the Kansas Plan was discussed. Under this plan a schedule of fees has been set up and agreed on by the Kansas Medical Society and the Veterans Administration. The medical society furnishes the Veterans Administration with a list of physicians willing to serve under the schedule. The Veterans Administration acts as its own administrative agency. The medical society confers with the Veterans Administration from time to time as problems that concern both arise. It was emphasized that no actual contractural arrangements had been entered into and that this plan was on the basis of a gentlemen's agreement. It was pointed out that in Kansas there was no organization comparable to the Massachusetts Medical Service (Blue Shield).

In reply to a question, Dr. McCarthy said that the contract that the physician participating in Blue Shield enters into concerns the administration of surgical and obstetric services only. He explained that this was not an all-inclusive contract and that the contract signed by the Blue Shield and the Veterans Administration would be all inclusive from the standpoint of the services offered. He added that the fee schedule now in force under the Blue Shield had nothing to do with the plan proposed.

In reply to a question, Dr. Norman A. Welch, Norfolk, said that the Blue Shield is open to any licensed practitioner of medicine in Massachusetts.

The motion was adopted by vote of the Council.

Dr. Reardon moved that the final approval of any contract entered into with the Veterans Administration concerning the Massachusetts Medical Society be delegated to the Executive Committee of the Council. This motion was seconded.

It was explained by the Secretary that the Executive Committee was in approval of this motion, whose intent was to make it unnecessary to call the Council together for the sole purpose of formally approving a contract that would be based on the agreements reached at this meeting of the Council.

The motion was adopted by vote of the Council.

Dr. Leavitt moved that when the contract heretofore referred to was under consideration in Washington, there should be on hand one or more duly appointed representatives of the Society empowered to approve any minor changes in the fee schedule that might prove advantageous. This motion was seconded by Dr. Alexander J. A. Campbell, Suffolk.

Dr. Albert A. Hornor, Suffolk, moved as an amendment to the motion the deletion of the words "in Washington." This amendment was seconded by Dr. Dwight O'Hara, Middlesex South. The motion as amended was adopted by vote of the Council.

The Secretary, speaking for the Executive Committee, made the following recommendation:

Certain questions arose in the committee that had to do with circumstances that concern the payment of the physician giving the prenatal and postnatal care, but not delivering the case. This same type of discussion arose in connection with the preoperative and postoperative service rendered by the physician who did not perform the operation involved. This discussion also concerned itself with the fees that should be allowed the surgeon's assistant at operations.

It was thought that $54.00 should be allowed for the physician giving the prenatal and postnatal care, and that in simple cases $54.00 should be allowed for the physician delivering the case. In difficult cases, a consultant delivering the case should receive a fee of $75.00. In this discussion it came out that this division of fees represents an administrative detail that should not appear in the schedule but should go, as a recommendation, to the administrative agent, which, in this case, it is hoped will be the Blue Shield.

The Secretary moved the adoption of this recommendation. This motion was seconded and it was so ordered by vote of the Council.

The Secretary continued:

The Executive Committee being conscious that such administrative problems may be numerous, at least during the early days of the administration of this plan by the Blue Shield, offers the following recommendation:

That a special committee of five be appointed by the President, and that this committee, representing the Massachusetts Medical Society, be empowered to act in an advisory capacity to the Blue Shield in the interpretation of the Veterans' Fee Schedule.

The Secretary moved the adoption of this recommendation. This motion was seconded by Dr. Leavitt, and it was so ordered by vote of the Council.

Dr. Leavitt moved the adoption of the report as a whole and as amended. This motion was seconded by Dr. Reardon, and it was so ordered by vote of the Council.

At the suggestion of the President, the Council extended a rising vote of thanks to the members of the committee who so devotedly put this report together.

It was moved and seconded that the Council adjourn. This motion was adopted by vote of the Council.

The President declared the Council adjourned at 6:30 p.m.

MICHAEL A. TIGHE, *Secretary*

APPENDIX NO. 1

ATTENDANCE OF COUNCILORS

BRISTOL NORTH

R. M. Chambers
W. J. Morse
J. L. Murphy

BRISTOL SOUTH

G. W. Blood
R. B. Butler
E. D. Gardner
C. C. Tripp

ESSEX NORTH

E. S. Bagnall
G. J. Connor
H. R. Kurth
P. J. Look
G. L. Richardson
F. W. Snow
C. F. Warren

ESSEX SOUTH

Bernard Appel
R. E. Foss
P. P. Johnson
E. D. Reynolds
P. E. Tivnan
C. F. Twomey
C. A. Worthen

FRANKLIN

J. E. Moran

HAMPDEN

E. P. Bagg
J. L. Chereskin
E. C. Dubois
Frederic Hagler
G. D. Henderson
Charles Jurist
A. H. Riordan
J. A. Seaman

MIDDLESEX EAST

J. L. Anderson
Richard Dutton
E. M. Halligan

MIDDLESEX NORTH

J. J. Cassidy
A. R. Gardner
M. A. Tighe

MIDDLESEX SOUTH

E. W. Barron
J. D. Bennett
G. F. H. Bowers
Madelaine R. Brown
R. N. Brown
R. W. Buck
E. J. Butler
C. W. Clark
J. A. Daley
C. L. Derick
J. G. Downing
C. W. Finnerty
H. G. Giddings
J. L. Golden
A. D. Guthrie
Eliot Hubbard, Jr.
A. M. Jackson
A. A. Levi
A. N. Makechnie
C. E. Mongan
G. M. Morrison
J. P. Nelligan
Dwight O'Hara
E. H. Robbins
M. J. Schlesinger
E. W. Small
J. E. Vance
C. F. Walcott
A. L. Watkins
Hovhannes Zovickian
W. J. Walton
N. A. Welch

NORFOLK

C. E. Allard
B. E. Barton
Carl Bearse
M. I. Berman
D. J. Collins
G. L. Doherty
Albert Ehrenfried
H. M. Emmons
Susannah Friedman
R. J. Heffernan
P. J. Jakmauh
I. R. Jankelson
C. J. Kickham
D. S. Luce
C. M. Lydon
F. P. McCarthy
H. L. McCarthy
F. J. Moran
Hyman Morrison
D. J. Mullane
J. J. O'Connell
W. R. Ohler
S. A. Robins
D. D. Scannell
L. A. Sieracki
Kathleyne S. Snow
S. L. Skvirsky
J. W. Spellman

NORFOLK SOUTH

C. S. Adams
D. L. Belding
Harry Braverman
Frederick Hinchliffe
D. B. Reardon

PLYMOUTH

A. L. Duncombe
P. B. Kelly
P. H. Leavitt
B. H. Peirce

SUFFOLK

A. J. A. Campbell
Reginald Fitz
Maurice Fremont-Smith
R. L. Goodale
A. A. Hornor
L. M. Hurxthal
H. A. Kelly
C. C. Lund
H. L. Musgrave
H. F. Newton
R. N. Nye
F. W. O'Brien
Helen S. Pittman
J. H. Pratt
H. F. Root
M. C. Sosman
S. N. Vose
Conrad Wesselhoeft

WORCESTER

C. R. Abbott
A. W. Atwood
Gordon Berry
F. P. Bousquet
E. J. Crane
J. M. Fallon
J. V. Gallagher
L. P. Leland
W. F. Lynch
J. C. McCann
A. E. O'Connell
H. L. Paine
R. S. Perkins
O. H. Stansfield
R. J. Ward
B. C. Wheeler

WORCESTER NORTH

H. C. Arey
D. B. Cheetham
C. B. Gay
J. V. McHugh
J. G. Simmons

APPENDIX NO. 2

FEE SCHEDULE APPROVED BY THE COUNCIL OF THE MASSACHUSETTS MEDICAL SOCIETY FOR MEDICAL SERVICES RENDERED UNDER THE VETERANS ADMINISTRATION MEDICAL CARE PROGRAM

Dermatology (including syphilis, granuloma inguinale and lymphopathia venereum)

1. Office	
a. Consultation	$16.20
b. Visit:	
(1) Initial (history, examination and prescribing)	10.80
(2) Subsequent prescribing	5.40
c. Dressings	5.40
d. Unna boot	10.80

e. Surgery
(1) Biopsy, not including cost of histologic section, culture and clinical examination ....
(a) Superficial 5.40
(b) Lymph node 10.80
(c) Needle aspiration 5.40
(2) Acne 5.40
(3) Incising localized abscess, boil, etc. 5.40
(4) Excising
(a) Benign lesions, uncomplicated (cyst, mole, fibroma, verruca, keratosis, etc.) ... 10.80
(b) Benign lesions, complicated 16.20
(c) Nails (ingrown or infected, or both) radical removal 16.20
(d) Malignant lesions 27.00

f. Injections
(1) Routine (calcium, sodium thiosulfate, etc.) 5.40
(2) Special
(a) Gold sodium thiosulfate 5.40
(b) Estrogens 5.40
(c) Vaccines 5.40
(d) Other parenteral injections (serums, liver, vitamin, venom, etc.) 5.40
(e) Sclerosing (hemangioma, etc.) 10.80

g. Ultraviolet radiation
(1) Alpine lamp 5.40
(2) Kromayer lamp 5.40
(3) Wood's filter examination 5.40

h. Carbon dioxide snow (topical application) 10.80

i. Fulguration
(1) Benign lesions 10.80
(2) Malignant lesions 16.20

j. X-ray therapy 16.20
(1) Localized area 10.80
(2) Generalized (spray) 10.80
(3) Plantar wart 10.80
(4) Spinal sympathetics 10.80
(5) Epilation
(a) Scalp (favus infection, etc.) 27.00
(b) Beard (tinea barbarae, etc.) 27.00

k. Radium
(1) 25 millicurie hours or less 21.60
(2) 26 to 100 millicurie hours 43.20
(3) 101 to 500 millicurie hours 81.00
(4) 50 millicurie hours or more 135.00

l. Electrolysis
(1) Mole 27.00
(2) Face (half-hour) 10.80

m. Autohemotherapy 10.80

n. Syphilis
(1) Darkfield (open lesion) 10.80
(2) Lymph-node puncture and darkfield 21.60
(3) Arsenical treatment, intravenous 10.80
(4) Bismuth treatment, intramuscular 5.40
(5) Follow-up (3-6-9-12 months; 2, 3, 4, 5, years) serology, urine and examination (per visit) 10.80
(6) All penicillin injections (massive doses) 10.80

o. Granuloma inguinale
(1) Biopsy plus cost histologic section 16.20
(2) Treatment
(a) Intravenous 10.80
(b) Intramuscular 5.40
(c) Surgical excision 27.00

p. Lymphopathia venereum
(1) Frei test 10.80
(2) Reading Frei test 5.40
(3) Biopsy (plus cost histologic section) 16.20
(4) Treatment
(a) Intravenous 10.80
(b) Intradermal 5.40
(c) Intramuscular 5.40
(d) X-ray (per treatment) 10.80
(e) Surgical excision 16.20
(f) Incision and drainage 16.20

q. Patch tests
(1) Initial visit 5.40
(2) Subsequent visits 5.40

r. Immunologic tests (intradermal and scratch) . 27.00

2. Home
a. Consultation (see Internal Medicine)
b. Radium
(1) 25 millicurie hours or less 27.00
(2) 26 to 100 millicurie hours 49.00
(3) 101 to 500 millicurie hours 86.40
(4) 501 millicurie hours or more 139.40
(5) Travel over 10 miles (per mile) 1.08
c. Autohemotherapy 10.80
d. Injections
(1) Intravenous 10.80
(2) Intramuscular or intradermal 10.80

Internal Medicine (including allergy, arthritis, cardiology, communicable diseases, diabetes, endocrinology, gastroenterology, hematology, nutritional dietetics, parasitology and tuberculosis)

1. Consultations
a. Office (to include routine urines, bloods and sputum examinations as indicated and the simpler blood chemical tests and electrocardiogram)
(1) Initial visit 21.60
(2) Subsequent visits 5.40
b. Outside office (to include routine urines, bloods and sputum examinations as indicated and the simpler blood chemical tests and electrocardiogram)
(1) Within 10-mile radius 27.00
(2) Outside 10-mile radius (per mile) 1.08
(3) Additional patients seen at same visit (per patient) 21.60
c. Patient cared for by the consultant in hospital shall be charged for the first week (per day) .. 5.40
Except in emergencies, such as diabetic coma, acute bulbar poliomyelitis or laryngeal diphtheria, requiring constant attendance, in case the fee would be — per hour 10.80
May be charged up to a maximum of 54.00
After the first week charge shall be — per week 27.00

2. Miscellaneous
a. First aid 5.40
b. Report of former medical examination — for six pages — or less 5.40
for each additional page ..... .54

3. Local Physician
a. Home visits
(1) 8:00 a.m. to 8:00 p.m.
(a) Within 3 miles 5.40
(b) Over 3 miles (add per mile) ..... .81
(2) 8:00 p.m. to 8:00 a.m.
(a) Within 3 miles 10.80
(b) Over 3 miles (add per mile) ..... .81
b. Office visits 4.32

Pediatrics

1. During first month of life: office
a. Initial visit 10.80
b. Subsequent visits (per visit) 5.40
(maximum $27 per week, exclusive of original visit)

2. During first year of life: fee-for-service office basis
a. Periodic physical examinations and regulation of diet, not more frequent than every 4 weeks (per visit) 5.40
b. Complete 3 inoculations whooping-cough immunization* 6.48
c. Complete 3 inoculations diphtheria immunization* 6.48
d. Smallpox vaccination, up to three attempts for each child (per vaccination)* 3.24

3. During first year of life: flat-fee office basis (to include immunization against smallpox, diphtheria, tetanus and whooping cough,* a minimum of six complete physical examinations spaced during the first year, office treatment of minor conditions, instruction of the

*The charges for inoculations referred to in these schedules do not include the cost of material used.

mother in infant care and supervision of infant feeding)	70.20
4. Routine care after first year (periodic health examinations, maximum two per year) (per visit)	5.54
5. Care of sick infant or child	
a. At home	
(1) Per visit	
(a) Day	5.40
(b) Night	10.20
(2) Maximum for any 3-week period	108.00
b. At hospital	
(1) Per visit	5.40
(2) Maximum for any 3-week period	108.00
6. Consultations	
Office (maximum)	16.20
Hospital — when consultant is on staff (maximum)	16.20
Home or hospital when consultant is not on staff	27.00

Psychiatry

1. Consultations	
a. Office	
(1) Initial visit	21.60
(2) Subsequent visits (per visit)	10.80
(b) House or hospital	
(1) Within 10 miles	27.00
(2) Beyond 10 miles (add per mile)	1.08
2. Special procedures	
(a) Shock treatment: O.P.D. (includes assistant's fee)	27.00
(b) Electroencephalogram (standard fee)	10.80
(c) Pneumoencephalogram (exclusive of x-ray films)	54.00

Roentgenology

1. Head and neck	
a. Skull, lateral stereoscopic and anteroposterior and posteroanterior stereoscopic	16.20
b. Skull, including paranasal sinuses	21.60
c. Paranasal sinuses	16.20
d. Encephalography,	27.00
including preliminary skull	37.80
e. Ventriculography,	27.00
including preliminary skull	37.80
f. Eye for foreign body	10.80
(1) For localizing foreign body (extra)	16.20
g. Mastoids, regular,	10.80
including petrous pyramids	16.20
h. Nose	10.80
i. Maxilla and facial bones	10.80
j. Mandibles (each)	10.80
k. Esophagus, including fluoroscopy	16.20
l. Sialography (without medium)	10.80
m. Optic foramens	10.80
n. Neck, for soft tissue (anteroposterior and lateral)	10.80
o. Teeth (complete set)	16.20
2. Chest	
a. Thorax (ribs)	10.80
b. Sternum	10.80
c. Lungs (stereoscopic, anteroposterior and lateral)	16.20
(1) Fluoroscopic examination (alone)	5.40
d. Heart, complete fluoroscopic and radiographic studies	16.20
(1) Single teleroentgenogram	10.80
e. Bronchography (with medium instillation)	37.80
3. Spine and pelvis	
a. Spine	
(1) Cervical	10.80
(2) Thoracic	10.80
(3) Lumbar	10.80
(4) Lumbar and pelvis	10.80
(5) Coccyx and sacrum	16.20
(6) Any two of the above areas	16.20
(7) Entire without cervical spine	21.60
(8) Entire with cervical spine	27.00
b. Myelography	37.80
c. Pelvis	10.80
d. All stereoscopic spine or pelvis (for each part)	5.54
4. Upper extremities	
a. Shoulder girdle	10.80
b. Clavicle	10.80
c. Shoulder joint	10.80
d. Humerus (shaft)	10.80
e. Elbow	10.80
f. Forearm	10.80
g. Wrist	10.80
h. Hand	10.80
i. Finger	5.40
j. Stereoscopic studies (extra)	5.40
5. Lower extremities	
a. Hip	10.80
b. Femur	10.80
c. Knee	10.80
d. Tibia and fibula	10.80
e. Ankle	10.80
f. Foot	10.80
g. Toes	5.40
h. Injection of sinuses for chronic osteomyelitis	21.60
i. Stereoscopic studies (extra)	5.40
6. Gastrointestinal tract	
a. Barium meal, with or without preliminary film of abdomen	21.60
b. Barium meal and enema	32.40
c. Barium meal, gall bladder (dye) and enema	37.80
d. Stomach and duodenum (check up)	16.20
e. Stomach, duodenum and gall bladder (dye)	32.40
f. Gall bladder and dye method	16.20
g. Fistula (contrast study)	21.60
h. Colon by barium enema (complete)	16.20
(1) Followed by air-contrast enema	21.60
i. Colon and gall bladder (dye)	27.00
j. Special small-bowel study	27.00
k. Cholangiogram	21.60
l. Kidney in situ (operation table)	10.80
7. Urinary tract	
a. Simple K.U.B.	10.80
b. Pyelography	
(1) Intravenous (injection of dye)	27.00
(2) Retrograde (x-ray only)	16.20
c. Cystography	16.20
d. Urethrocystography	16.20
8. Genital tract	
a. Pregnancy	
(1) With measurements	16.20
(2) Without measurements	10.80
b. Uterosalpingography (with injection of medium)	21.60
9. Fluoroscopic (to include reduction of fractures, foreign-body detection, foreign-body removal and foreign bodies in esophagus or respiratory tract)	21.60
10. General	
a. Mammary-gland study	16.20
(1) With air injection	27.00
b. Interpretation of films	5.40
c. Portable	
(1) Within 10 miles	27.00
(2) Beyond 10 miles (add per mile)	1.08
11. Therapy	
a. X-ray treatments	
(1) Each	10.80
(2) Series (maximum)	108.00
b. Radium treatments	
(1) 25 millicurie hours or less	27.00
(2) 26 to 100 millicurie hours	49.00
(3) 101 to 500 millicurie hours	86.40
(4) 501 millicurie hours or more	139.40
(5) Travel over 10 miles (add per mile)	1.08
(6) Follow-up examination (each)	5.40

Surgery

1. Anesthesia (the practice of anesthesiology includes the preliminary preparation of the patient

for anesthesia, supervision of premedication, selection of anesthetic agents and methods, the administration of anesthetic agents, the treatment of all complications pertaining to anesthesia during the operation and postoperatively and the treatment of certain medical conditions, such as pulmonary and other conditions requiring the services of an anesthesiologist — i.e. asphyxia, drug poisoning, caisson disease, asthma, convulsions, etc.)

a. Inhalation anesthesia

(1) Ether — up to ½ hour	10.80
Each additional ½ hour	5.40
(2) Gas	
(a) Conventional	
(*1*) Nitrous oxide up to ½ hour	10.80
Each additional ½ hour	5.40
(*2*) Ethylene, up to ½ hour	10.80
Each additional ½ hour	5.40
(*3*) Carbon dioxide, up to ½ hour	10.80
Each additional ½ hour	5.40
(*4*) Oxygen, up to ½ hour	10.80
Each additional ½ hour	5.40
(b) Special:	
(*1*) Cyclopropane, up to ½ hour	16.20
Each additional ½ hour	5.40
(*2*) Helium and oxygen, up to ½ hour	16.20
Each additional ½ hour	5.40
(3) Venethene, up to ½ hour	10.80
Each additional ½ hour	5.40
(4) Ethyl chloride, up to ½ hour	10.80
Each additional ½ hour	5.40
(5) Chloroform, up to ½ hour	10.80
Each additional ½ hour	5.40
(6) Curare	16.20

b. Regional anesthesia

(1) Spinal	
(a) With or without supplement, up to ½ hr.	16.20
Each additional ½ hour	5.40
(b) Continuous, up to ½ hour	16.20
Each additional ½ hour	5.40
(2) Local infiltration, with or without supplement, up to ½ hour	16.20
(3) Nerve block, with or without supplement	
(a) Minor (single nerve), up to ½ hour	10.80
Each additional ½ hour	5.40
(b) Major	
(*a*) (Paravertebral) up to ½ hour	16.20
Each additional ½ hour	5.40
(*b*) Plexus, up to ½ hour	16.20
Each additional ½ hour	5.40
(4) Field block, with or without supplement, up to ½ hour	16.20
Each additional ½ hour	5.40
(5) Topical (permeation), up to ½ hour	10.80
Each additional ½ hour	5.40

c. Intravenous anesthesia, with or without supplement

(1) Pentothal Sodium, up to ½ hour	16.20
Each additional ½ hour	5.40
(2) Sodium Evipal, up to ½ hour	16.20
Each additional ½ hour	5.40

d. Rectal anesthesia, with or without supplement

(1) Tribromethanol in amylene hydrate (Avertin, fluid), up to ½ hour	16.20
Each additional ½ hour	5.40
(2) Paraldehyde, up to ½ hour	10.80
Each additional ½ hour	5.40
(3) Evipal Soluble, up to ½ hour	16.20
Each additional ½ hour	5.40
(4) Pentothal, up to ½ hour	16.20
Each additional ½ hour	5.40
(5) Ether-in-oil, up to ½ hour	10.80
Each additional ½ hour	5.40

e. Special technics

(1) Intratracheal anesthesia — up to ½ hour (additional)	5.40
(2) Suction bronchoscopy	16.20
(3) Venoclysis	5.40
(4) Transfusions	21.60
(5) Refrigeration	16.20

2. Clinical Pathology

a. Bacteriological

(1) Cultural examination for fungi	5.40
(2) Routine culture	2.16
(3) Pus or exudate, cultural examination, including classification of organism	5.40
(4) Throat culture, including classification of organism	5.40
(5) Blood culture	5.40
(6) Examination of smears	2.16

b. Pathological

(1) Autopsy	54.00
(2) Tissue examination, including smear for carcinoma	5.40
(3) Frozen section (rush diagnosis at laboratory)	10.80
(4) Frozen section (rush diagnosis at hospital)	27.00
(5) Guinea-pig inoculation	5.40

c. Blood

(1) Red count, white count, differential and hemoglobin	5.40
(2) Red count	2.16
(3) White count	2.16
(4) Differential	2.16
(5) Hemoglobin (Sahli)	2.16
(6) Platelet count	2.16
(7) Malarial parasites	5.40
(8) Bleeding and coagulation times	2.16
(9) Fragility test	5.40
(10) Sedimentation time	5.40
(11) Clot retraction	2.16
(12) Prothrombin time	3.24
(13) Hematocrit	5.40
(14) Grouping for transfusion	3.24
(15) Direct agglutination	5.40
(16) Aschheim–Zondek test	10.80
(17) Kahn test	3.24
(18) Hinton test (routine)	3.24
(19) Hinton test (rapid)	3.24
(20) Kolmer–Wassermann test	5.40
(21) Schwartz–McNeil test (complement-fixation test for gonorrhea)	5.40
(22) Heterophile antibody reaction	3.24
(23) Rh factor	5.40

d. Blood chemistry

(1) Albumin-globulin ratio	10.80
(2) Bromide	3.24
(3) Calcium	5.40
(4) Cephalin-cholesterol	3.24
(5) Chloride	3.24
(6) Cholesterol	6.48
(7) Carbon dioxide combining power	5.40
(8) Creatine	3.24
(9) Diastase	3.24
(10) Galactose-tolerance test	5.40
(11) Icterus index	2.16
(12) Nonprotein nitrogen	3.24
(13) Phosphatase, acid	5.40
(14) Phosphatase, alkaline	5.40
(15) Phosphorus	5.40
(16) Potassium thiocyanate	3.24
(17) Sugar	3.24
(18) Sugar and nonprotein nitrogen (same blood)	5.40
(19) Sulfonamide, concentrations	3.24
(20) Total protein	3.24
(21) Urea nitrogen	3.24
(22) Uric acid	3.24
(23) Van den Bergh	5.40

e. Feces

(1) Cross and microscopic (complete)	5.40
(2) Occult blood	2.16
(3) Fat	1.08
(4) Parasites	5.40

f. Skin tests

(1) Protein tests (each group of 25 proteins)	5.40
(2) Hay-fever test	5.40

g. Spinal fluid		
(1) Complete		27.00
(2) Cell count		2.70
(3) Culture		2.16
(4) Quantitative		
(a) Protein		8.10
(b) Sugar		5.40
(c) Chloride		5.40
(5) Gold-sol test		5.40
(6) Davies–Hinton test		3.24
(7) Kolmer–Wassermann test		5.40
h. Stomach contents		
(1) Gastric analysis		5.40
i. Urine		
(1) Routine (complete)		2.16
(2) Routine, without microscopic		1.08
(3) Microscopic alone		1.08
(4) Hippuric acid		3.24
(5) Diastase		3.78
(6) Urobilinogen		2.16
(7) Kidney-function test (phenolsulfonephthalein)		3.24
(8) Bence–Jones protein		3.24
(9) Aschheim–Zondek test		10.80
j. Miscellaneous		
(1) Basal-metabolism test		5.40
(2) Autogenous vaccine		10.80
(3) Hormone studies (by arrangement)		
(4) Glucose-tolerance test (including determination of blood and urine sugar)		10.80
3. Diabetic Surgery		
a. Infections of skin and subcutaneous tissues, excluding carbuncles		
(1) Incision and drainage, including one week's postoperative dressings		54.00
(2) Subsequent hospital care		
(a) Per week		27.00
(b) Maximum		162.00
b. Carbuncles		
(1) Incision and drainage or excision, including one week's postoperative dressings		81.00
(2) Subsequent hospital care		
(a) Per week		27.00
(b) Maximum		270.00
(3) Excision and skin graft		108.00
c. Upper extremities		
(1) Amputations — infections of hand (charge for operation same as in patient without diabetes)		
(a) Postoperative dressings		
(1) Per week		27.00
(2) Maximum		270.00
d. Lower extremities		
(1) Infection and gangrene		
(a) Amputation		
(1) Through or above lower leg		135.00
(2) Secondary closure or reamputation		243.00
(3) One or more digits (open or closed) through a phalanx		54.00
(b) Incision and drainage		
(1) Superficial infection of foot, including one week's aftercare		54.00
(a) Subsequent surgical care (per week)		27.00
(b) Maximum		162.00
(2) Deep infection of foot, with or without the amputation of one or more toes, including one week's aftercare		108.00
(a) Subsequent surgical care per week		27.00
(b) Maximum		270.00
(c) Multiple operations on an extremity during same hospital admission, including aftercare — maximum		270.00
4. General Surgery		
a. Consultations (see Internal Medicine)		
b. Carcinoma of lip (upper or lower)		
(1) Simple excision		54.00
(2) Simple excision, with plastic		81.00
(3) Excision, with upper-neck dissection		81.00
c. Radical dissection of neck (one side)		108.00
d. Carcinoma of tongue, excision		108.00
e. Implantation of radium, tongue		108.00
f. Excision		
(1) Thryoglossal cyst or sinus		108.00
(2) Branchial cyst		108.00
(3) Submaxillary gland		81.00
(4) Mixed tumor parotid		108.00
(5) Malignant tumor parotid		162.00
(6) Esophageal diverticulum, two stages		216.00
g. Biopsy		
(1) Lymph nodes of neck		27.00
(2) Tumor of neck (deep)		54.00
h. Incision and drainage		
(1) Superficial cervical abscess		27.00
(2) Deep cervical abscess		54.00
(3) Submental abscess		27.00
(4) Ludwig's angina		162.00
(5) Ludwig's angina, with tracheotomy		162.00
i. Dilatation of esophagus		54.00
j. Excision of thyroid adenoma		108.00
k. Thyroidectomy		
(1) Total		216.00
(2) Subtotal (two stages)		189.00
(3) Subtotal (one stage)		135.00
l. Carcinoma of thyroid		
(1) Removal of one lobe, with neck dissection		189.00
(2) Removal of isthmus		108.00
m. Incision and drainage, thyroiditis		108.00
n. Exploration and biopsy, thyroid		108.00
o. Removal of parathyroid adenoma		216.00
p. Transpleural resection of esophagus		216.00
q. Transpleural resection of stomach, partial or total		216.00
r. Gastrectomy, abdominal		
(1) Complete		216.00
(2) Subtotal, with or without excision of ulcer		189.00
s. Gastroscopy		54.00
t. Gastrostomy		135.00
u. Gastroenterostomy, anterior or posterior		162.00
v. Pyloroplasty		162.00
w. Perforated peptic ulcer, closure		135.00
x. Gastrojejunal ulcer		189.00
y. Gastrojejunal colic fistula (two stages)		270.00
z. Acute pancreatitis		
(1) Drainage of pancreas		108.00
(2) Drainage of pancreas and gall bladder		135.00
(3) Drainage of pancreas and common duct		162.00
aa. Carcinoma of pancreas, radical		
(1) One stage		216.00
(2) Two stages		270.00
bb. Carcinoma of extrahepatic biliary tree		216.00
cc. Exploratory laparotomy		108.00
dd. Lysis of adhesions		108.00
ee. Pyloric stenosis (Rammstedt's operation)		162.00
ff. Cholecystotomy		108.00
gg. Cholecystectomy		162.00
hh. Cholecystotomy or cholecystectomy, with exploration common duct		189.00
ii. Plastic procedures on common duct		216.00
jj. Re-exploration of common duct		216.00
kk. Cholecystenterostomy		162.00
ll. Cholecysduodenostomy		162.00
mm. Cholecystgastrostomy		162.00
nn. Splenectomy		162.00
oo. Intussusception, with simple reduction		135.00
pp. Volvulus, with reduction		135.00
qq. Appendectomy		
(1) Uncomplicated		108.00
(2) Ruptured		135.00

	(3) Secondary (following abscess or peritonitis)	135.00
rr.	Resection of bowel	216.00
ss.	Cecostomy	108.00
tt.	Colostomy, temporary or permanent	108.00
uu.	Mikulicz's resection, including crushing of spur and first closure	270.00
vv.	Miles's resection	216.00
ww.	Lahey's resection (two stages)	270.00
xx.	Colostomy, with posterior resection (two stages)	270.00
yy.	Ulcerative colitis	
	(1) Ileostomy	108.00
	(2) Resections of large intestine (each stage)	108.00
zz.	Diverticulitis	
	(1) Drainage of abscess	135.00
	(2) Drainage and colostomy	189.00
aaa.	Closure of vesicocolic fistula (all stages)	270.00
bbb.	Closure of colostomy other than above	108.00
ccc.	Closure of cecostomy	108.00
ddd.	Jejunostomy	108.00
eee.	Closure of fistual small intestine	135.00
fff.	Repair of hernia	
	(1) Ventral	108.00
	(2) Inguinal	108.00
	(3) Femoral	108.00
	(4) Sliding inguinal	135.00
	(5) Bilateral inguinal	162.00
	(6) Bilateral femoral	162.00
	(7) Recurrent	162.00
	(8) Recurrent, with fascial repair	189.00
	(9) Strangulated	162.00
	(10) Strangulated, with resection of small intestine	216.00
	(11) Incarcerated umbilical hernia	162.00
	(12) Diaphragmatic, transpleural or transperitoneal	216.00
ggg.	Peritoneoscopy	54.00
	(1) With biopsy	81.00
hhh.	Paracentesis, abdominal	10.00
iii.	Excision of ulcer, with grafting	108.00
jjj.	Kondoleon's operation (each operation)	108.00
kkk.	Breast	
	(1) Biopsy, male or female	37.80
	(2) Simple mastectomy	
	(a) Male	54.00
	(b) Female	81.00
	(3) Abscess, drainage	37.80
	(4) Radical mastectomy	162.00
	(5) Adenoma, removal	54.00
	(6) Implantation of radium	54.00
lll.	Lipectomy	37.80
mmm.	Sebaceous cyst	21.60
nnn.	Incision and drainage of infected cyst	16.20
ooo.	Blood transfusion	27.00
ppp.	Biopsy	
	(1) Muscle	27.00
	(2) Bone	81.00
	(3) Sternum	27.00
qqq.	Incision and drainage of pilonidal abscess	27.00
rrr.	Excision pilonidal cyst or sinus	81.00
sss.	Dupuytren's contraction	135.00
ttt	Repair of tendon	
	(1) One	108.00
	(2) Two	162.00
	(3) Three	216.00
	(4) Four or more	270.00
uuu.	Excision of ingrowing toe nail	
	(1) Single	27.00
	(2) Bilateral	54.00
vvv.	Lumbar puncture	10.80
www.	Chest tap	27.00
xxx.	Amputation	
	(1) Gangrenous lower leg	108.00
	(2) Thigh	135.00
	(3) Toe	37.80
aaaa.	Lumbar sympathetic block	27.00
bbbb.	Cervicodorsal sympathetic block	37.00
cccc.	Arteriovenous aneurysm, quadruple ligation	216.00
dddd.	Arterial aneurysmorrhaphy	270.00
eeee.	Arterial femoral embolectomy, with sympathetic block	135.00
ffff.	Arterial popliteal embolectomy, with sympathetic block	135.00
gggg.	Arterial iliac embolectomy, with sympathetic block	216.00
hhhh.	Malignant melanoma	
	(1) Removal	108.00
	(2) Removal, with axillary dissection	162.00
	(3) Removal, with neck dissection	162.00
	(4) Removal, with groin dissection	216.00
iiii.	Soft-tissue sarcoma, superficial	
	(1) Removal	108.00
	(2) Removal, with axillary dissection	162.00
	(3) Removal, with neck dissection	162.00
	(4) Removal, with groin dissection	216.00
5.	Surgery of Hand and Forearm	
a.	Dressings — particularly first one done after extensive operation in which complicated pieces of apparatus are used for splinting purposes, if requiring an hour	27.00
b.	First aid	
	(1) Management of so-called simple wounds not requiring sutures	5.40
	(2) Treatment of wounds requiring suturing of skin excluding tendons and nerves — in physician's office or treatment room	27.00
c.	Incision and drainage	
	(1) Furuncle	10.80
	(2) Carbuncle	27.00
	(3) Paronychia	10.80
	(4) Subungual abscess	10.80
	(5) Pulp-space infection	27.00
	(6) Osteomyelitis (terminal phalanx)	54.00
	(7) Septic finger, joint	27.00
	(8) Tendon-sheath infection (1st, 2nd or 3rd fingers)	54.00
	(9) Tendon-sheath infection (thumb or ring finger)	108.00
	(10) Thenar-space abscess	54.00
	(11) Midpalmar-space abscess	54.00
	(12) Cellulitis (dorsum of hand)	27.00
	(13) Cellulitis (forearm)	54.00
	(14) Infected bursa (elbow)	54.00
d.	Débridement, extensive, with suturing with or without manipulation of fractures and application of specially prepared splints	162.00
e.	Plastic, traumatic amputation	
	(1) One finger	81.00
	(2) Two or more fingers	135.00
f.	Fractures of finger	
	(1) Simple	10.80
	(2) Requiring manipulation	21.60
	(3) Each additional finger	17.20
	(4) Compound	
	(a) One finger	54.00
	(b) Two or more fingers	108.00
	(c) Involving joint	108.00
6.	Infantile Paralysis (Orthopedic Care)	
a.	Hospital care (operative fees shall include all preoperative and postoperative hospital care, but not subsequent office visits)	
	(1) Nonoperative care of patient (per day)	5.40
	(2) Operative cases remaining in hospital after 3 weeks (per day)	2.16
	(3) Total compensation for all hospital care not in any case to exceed (unless special arrangements are made)	216.00
b.	Equinus	54.00
c.	Tenotomy	54.00
d.	Foot stabilization	162.00
e.	Tendon transplantation	162.00

(1) Shoulder for trapezius	162.00
(2) Elbow for triceps and biceps	108.00
(3) Forearm and hand	
(a) One muscle	108.00
(b) Each additional muscle	21.60
(4) Lower extremity	
(a) Erector spinal transplant	216.00
(b) Gluteus medius	162.00
(c) Quadriceps	162.00
(d) Peroneal or posterior tibial	81.00
(e) Extensor hallucis	54.00
7. Neurosurgery	
a. Craniology	
(1) In cranial or intracranial injuries or both	
(a) For depressed fractures	270.00
(b) For compound fractures	270.00
(1) With C. S. F. rhinorrhea	270.00
(2) Into frontal sinus	270.00
(c) For extradural hematomas	270.00
(d) For subdural hematomas	270.00
(e) For intracortical clots	270.00
(f) For exploratory trephination	
(1) One side	108.00
(2) Two sides	162.00
(2) In cranial or intracranial infection or both	
(a) For osteomyelitis of skull	216.00
(b) For brain abscess	216.00
(3) In cranial or intracranial congenital defects or both	
(a) For oxycephaly	324.00
(b) For platybasia	324.00
(c) For hydrocephalus	
(1) Choroidectomy	162.00
(2) Torkilson operation	270.00
(3) Third ventriculostomy	324.00
(d) For excision of encephalocele	324.00
(4) In cranial or intracranial tumors or both	
(a) For surgical therapy of tumor	378.00
(b) For intracranial exposure of aneurysm	378.00
(5) In the treatment of pain and malignant disease	
(a) For section of the sensory root of the	
(1) Fifth cranial nerve	216.00
(2) Transtemporal route	216.00
(3) Through the posterior fossa	270.00
(4) Intramedullary	324.00
(b) For section of the vestibular nerve	270.00
(c) For combined section of the fifth and ninth cranial nerves	270.00
(d) For medullotomy	324.00
(6) In miscellaneous cranial or intracranial conditions or both	
(a) For repair of skull defect	324.00
(b) For excision of cortical scar	324.00
(c) For ablation of cortex	324.00
(d) For frontal lobotomy	270.00
(e) For bilateral orbital decompression	324.00
b. Laminectomy	
(1) In spinal cord or cauda equina injuries or both	
(a) For compounded wound	324.00
(b) For decompression	216.00
(c) For removal of, or exploration for, an extruded nucleus pulposus or ruptured intervertebral disk	324.00
(d) For anterior rhizotomy in the treatment of transverse myelitis	324.00
(2) In spinal cord or cauda equina infections or both	
(a) For drainage of abscess	216.00
(b) For anterior rhizotomy in the treatment of transverse myelitis	324.00
(3) In spinal cord or cauda equina congenital defects or both	
(a) For excision and repair of meningocele or meningomyelocele or both	162.00
(4) In spinal cord or cauda equina tumors or both	
(a) For exposure of tumor	324.00
(5) In the treatment of pain and malignant disease	
(a) For nerve section	270.00
(b) For cordotomy	270.00
c. Operations on the sympathetic nervous system	
(1) Unilateral resection	216.00
(2) Bilateral resection	324.00
(3) Presacral-plexus resection	216.00
d. Peripheral-nerve operations	
(1) Suture, decompression and transplantation (one or more) of single and multiple nerves	324.00
(2) Surgical therapy of painful amputation stumps	270.00
e. Diagnostic procedures	
(1) Queckenstedt test	10.80
(2) Cystometrogram	54.00
(3) Myelogram (plus x-ray fee)	54.00
(4) Ventriculogram or ventriculostomy (plus x-ray fee)	54.00
(5) Pneumoencephalogram (plus x-ray fee)	37.80
(6) Visualization of intracranial aneurysm by intracarotid injection of dye (plus x-ray fee)	108.00
f. Other procedures and conditions	
(1) Débridement and secondary closure of bed or pressure sores	216.00
(2) Débridement and suture of scalp wounds	54.00
(3) Therapy of simple nonoperable brain injury with or without associated cranial fracture	108.00
(4) Therapy of simple nonoperable injury of spinal cord or cauda equina or both	378.00
(5) Carotid ligation for intracranial arteriovenous fistula or an aneurysm	108.00
(6) Operation for scalenus anticus syndrome	216.00
(7) Intraspinal, paravertebral or paracranial alcohol injection	37.80
8. Obstetrics and gynecology	
a. Consultations	
(1) Office, with examination and consultation	10.80
(2) Subsequent office examination	5.40
(3) Cauterization of cervix	16.20
(4) Insufflation of fallopian tubes	16.20
(5) Biopsy (cervix or endometrium)	16.20
(6) Hospital	16.20
b. Delivery — pelvic	108.00
c. Operations	
(1) Dilatation and curettage of uterus	54.00
(2) Cesarean section (any type)	162.00
(3) Ectopic pregnancy	162.00
(4) Hysterectomy (supracervical)	145.00
(5) Complete hysterectomy	162.00
(6) Vaginal hysterectomy	162.00
(7) Complete hysterectomy (Wertheim operation)	270.00
(8) Myomectomy	135.00
(9) Uterine suspension	
(a) Simple	108.00
(b) With dilatation and curettage or vaginal plastic	135.00
(c) With appendectomy or adnexal surgery	135.00
(d) With plastic surgery and adnexal surgery	135.00
(10) Removal of ovarian cyst	135.00
(11) Presacral neurectomy: dilatation and curettage, with or without suspension	162.00
(12) Salpingectomy, with or without oophorectomy	135.00
(13) Bartholin's gland	
(a) Incision	10.80
(b) Excision	54.00
(14) Urethral caruncle	27.00
(15) Removal of labial cysts and tumors	37.80
(16) Correction of atresia of vagina	162.00
(17) Hymenectomy	27.00
(18) Posterior colpoperineorrhaphy	81.00

(19) Amputation of cervix or trachelorrhaphy	81.00
(20) Anterior colporrhaphy	81.00
(21) Anterior colporrhaphy—perineorrhaphy	108.00
(22) Manchester operation	135.00
(23) Watkins's operation	162.00
(24) Colpocleisis (partial or complete)	135.00
(25) Plastic for functional incontinence of urine	135.00
(26) Rectovaginal fistula	135.00
(27) Vesicovaginal fistula	162.00
(28) Cul-de-sac drainage	37.80
(29) Cauterization or conization of cervix	27.00
(30) Uterine polypectomy	27.00
(31) Vulvectomy	
(a) Simple	108.00
(b) Radical	162.00
(32) Correction of uterine displacement and insertion of pessary	10.80
9. Ophthalmology	
a. Consultations	
(1) Office	
(a) Initial visit	10.80
(b) Subsequent visits	5.40
(2) Outside office	
(a) Within 10 miles	27.00
(b) Beyond 10 miles (add per mile)	1.08
b. Operations	
(1) Removal of foreign body embedded in cornea	5.40
(2) Removal of intraocular foreign body	135.00
(3) Repair of conjunctival laceration	27.00
(4) Suturing of perforating wound of globe and iridectomy, if needed	108.00
(5) Peritomy	27.00
(6) Optical iridectomy	108.00
(7) Chalazion, incision and curettage	16.20
(8) Corneal ulcer	
(a) Conjunctival flap for	54.00
(b) Keratotomy for	27.00
(c) Cauterization or pasteurization of	27.00
(9) Keratectomy (for corneal scar)	81.00
(10) Corneal transplantation	216.00
(11) Cataract:	
(a) Needling — as often as necessary	108.00
(b) Removal, including needed discissions	162.00
(c) Discission of secondary cataract	54.00
(12) Iridotomy for blocked pupil	81.00
(13) Lachrymal sac, excision of	81.00
(14) Probing of lachrymal duct (in office)	10.80
(15) Probing of congenital obstruction of lachrymal duct	27.00
(16) Dacryocystorrhinostomy	162.00
(17) Incision for acute dacryocystitis	16.20
(18) Glaucoma	
(a) Acute — iridectomy	162.00
(b) Chronic	
(1) Filtration operation	162.00
(2) Cyclodiathermy	81.00
(19) Paracentesis	54.00
(20) Tarsorrhaphy	54.00
(21) Ptosis, operation	162.00
(22) Ectropion, operation	108.00
(23) Entropion, operation	54.00
(24) Snellen suture for entropion or ectropion	16.20
(25) Scalping lid margin for trichiasis	54.00
(26) Retinal separation (as many as needed)	162.00
(27) Enucleation or evisceration of globe	108.00
(28) Exenteration of orbit	216.00
10. Oral and maxillofacial surgery	
a. Diagnostic workup	
(1) Hospital	54.00
(2) Office	37.80
b. Vitalization test (complete)	37.80
c. Fractures (mandible, maxilla, nasal and malar bones), 6 weeks' period of treatment	
(1) Simple	189.00
(2) Compound	243.00
(3) Multiple	324.00
d. Osteomyelitis	
(1) Chronic, 8 weeks' period of treatment	243.00
(2) Acute, 20 weeks' period of treatment	324.00
e. Cellulitis, incision and drainage, 2 weeks' period of treatment	
(1) Intraoral	70.20
(2) Extraoral	108.00
f. Cysts	
(1) Soft tissue	81.00
(2) Bone	162.00
g. Removal of teeth	
(1) Simple	16.20
(2) Surgical	37.80
(3) Impacted	81.00
(4) Complete mouth	135.00
h. Apicoectomy	54.00
i. Alveolotomy	108.00
j. Frenum, lip or tongue	54.00
k. Dislocation of mandible, immobilization for	135.00
l. Alveolar antral opening, plastic repair of	108.00
m. Alveolar abscess, incision and drainage of	37.80
n. Foreign body in jaw	108.00
o. Biopsy	
(1) Soft tissue	37.80
(2) Bone	54.00
p. Surgical reattachment of muscle	70.20
q. Vincent's angina, 2 weeks' period of treatment	81.00
r. Tic douloureux	
(1) Alcohol injection	54.00
(2) Resection of nerve trunk	189.00
s. Oral antral infection, 3 weeks' period of treatment	162.00
t. Gingivectomy, quarter area (surgery or electrocoagulation)	135.00
u. Periodontosis, 2 weeks' period of treatment	108.00
v. Sialolithotomy	81.00
w. Osteotomy	108.00
x. Tumors	
(1) Benign	81.00
(2) Malignant	216.00
y. Ostearthrotomy	189.00
z. Plastic surgery reconstruction of ridge	162.00
(1) With Thiersch-graft implant	216.00
aa. Granuloma, curettage of	37.80
bb. Bone graft	216.00
11. Orthopedic surgery	
a. Biopsy, bone, operative	54.00
b. Casts (plaster or similar material), not including first application with reduction or operation	
(1) Forearm	16.20
(2) Entire arm	21.60
(3) Shoulder spica	43.00
(4) Leg to knee	16.20
(5) Leg to groin	21.60
(6) Leg spica	54.00
(7) Plaster jacket	54.00
(a) Including head	64.80
c. Fractures	
(1) Simple	
(a) Nose	16.20
(b) Maxilla, inferior	27.00
(c) Maxilla, superior	16.20
(d) Spine	162.00
(e) Ribs	10.80
(f) Clavicle	54.00
(g) Scapula	54.00
(h) Humerus	108.00
(i) Elbow (excepting head of radius)	81.00
(j) Radius and ulna shaft	108.00
(k) Radius, shaft only	81.00
(l) Colles's fracture	
(1) Closed	70.20
(2) Open	118.00
(m) Ulna, shaft only	54.00
(n) Radius, head of	54.00

(o) Metacarpals	
(1) Single bone or any or all of middle three	27.00
(2) Each extra metacarpal	5.40
(p) Carpal bone, one	27.00
(q) Scaphoid, closed	32.40
(r) Finger	
(1) One	21.60
(2) Each extra	16.20
(s) Pelvis	108.00
(t) Femur	
(1) Shaft including supracondylar	162.00
(2) Intracapsular	216.00
(3) Intertrochanteric	162.00
(u) Tibia, shaft	81.00
(v) Tibia, involving knee joint	162.00
(w) Shaft of fibula	27.00
(x) Tibia and fibula (including Pott's fracture)	108.00
(1) Trimalleolar	162.00
(y) Fracture of patella (simple)	54.00
(z) Metatarsal bone	
(1) One	32.40
(2) Each additional	10.80
(aa) Tarsal bone, one, excluding os calcis and astragalus	27.00
(bb) Os calcis and subastragalus, each	162.00
(cc) Great toe	10.80
(2) In fractures requiring an open reduction, the maximum amount of reimbursement will be twice the amount shown for simple fractures except for Colles fracture (see above), up to	162.00
(3) The fees for all compound fractures are double those of simple fractures	
d. Dislocations, fresh	
(1) Spine	189.00
(2) Maxilla, inferior	27.00
(3) Clavicle	
(a) Simple	54.00
(b) Requiring open operation	108.00
(4) Shoulder	54.00
(5) Elbow	54.00
(6) Shoulder and elbow, requiring open operation	162.00
(7) Wrist	81.00
(8) Metacarpal bone	
(a) One	16.20
(b) Each extra	5.40
(c) Requiring open operation, charges are doubled	
(9) First metacarpophalangeal joint	
(a) Simple	21.60
(b) Requiring open operation	81.00
(10) Carpal bone	
(a) One	27.00
(b) One or more, open operation	81.00
(11) Finger	
(a) Simple	
(1) One	5.40
(2) Each additional	5.40
(b) Requiring open operation	5.40
(1) One	10.80
(2) Each additional	10.80
(12) Hip	
(a) Simple	108.00
(b) Requiring open operation	162.00
(13) Knee	
(a) Simple	108.00
(b) Requiring open operation	162.00
(14) Knee, semilunar cartilage	
(a) Simple	27.00
(b) Requiring open operation	162.00
(15) Tarsal bones, excepting astragalus and os calcis	
(a) Simple	27.00
(b) Requiring open operation	54.00
(16) Tibioastragalus	54.00
(17) Subastragalus	54.00
(18) Mediotarsal	54.00
(19) Metatarsal bone	
(a) One	5.40
(b) Each additional	5.40
(20) Toe	
(a) One	5.40
(b) Each additional	5.40
e. Joint resections	
(1) Shoulder	162.00
(2) Elbow	108.00
(3) Wrist	108.00
(4) Hip	162.00
(5) Ankle	162.00
(6) Complete rupture of supraspinatus tendon	189.00
f. Orthopedic operations	
(1) Spinal fusion	216.00
(2) Talipes	162.00
(3) Tenotomy	54.00
(4) Tenorrhaphy	108.00
(5) Arthrotomy, any major joint	108.00
(6) Acute osteomyelitis	162.00
(7) Chronic osteomyelitis, sequestrum removal	162.00
(8) Foot stabilization	162.00
(9) Arthrodesis of knee, shoulder or elbow	162.00
(10) Arthroplasty, any major joint	162.00
(11) Arthrodesis of hip	216.00
g. Amputations	
(1) Shoulder	108.00
(2) Hand	108.00
(3) Hip	162.00
(4) Knee	162.00
(5) Leg	162.00
(6) Foot	108.00
(7) Elbow	108.00
(8) Arm	
(a) Disarticulation, uncomplicated	162.00
(b) Head or neck	108.00
(c) Below neck	81.00
(9) Hand at wrist	108.00
(10) Carpus	64.00
(11) Metacarpus	54.00
(12) Phalanx	32.40
(13) Thigh, disarticulation	162.00
(14) Leg at knee	108.00
(15) Patella, excision	81.00
(16) Femur, head and neck	162.00
(17) Tibia or fibula	108.00
(18) Foot, metatarsus	81.00
(19) Os calcis (Syme's amputation)	108.00
(20) Phalanx (toe)	32.40
(21) Astragalectomy	108.00
(22) Laminectomy or other osteoplastic	216.00
(23) Coccyx, removal	81.00
(24) Spinal fusion, involving bone inlay	216.00
(25) Removal of semilunar cartilage	108.00
(26) Rib excision or resection	54.00
(27) Arthrodesis, wrist	162.00
(28) Bone graft — including postoperative therapy	
(a) For non-union of femur	270.00
(b) For non-union of tibia	216.00
(c) Humerus	189.00
(d) Forearm	189.00
h. Ganglion, excision of	
(1) Simple	27.00
(2) Involving joint	54.00
12. Otolaryngology	
a. Endoscopy	
(1) Bronchoscopy	
(a) Diagnostic	27.00
(b) Therapeutic	27.00
(1) Bronchoscopic aspiration	27.00
(2) Removal of tumor or implantation of radium	135.00
(3) Removal of foreign body	135.00
(2) Esophagoscopy, observation	27.00
(3) Bronchogram	27.00

b. Nose and throat operations

(1) Abscess, incision and drainage	
(a) Base of tongue	70.20
(b) Epiglottis	70.20
(c) Floor of mouth	70.20
(d) Larynx	189.00
(e) Ludwig's angina	162.00
(f) Orbital (external ethmoidectomy)	216.00
(g) Pharyngomaxillary fossas	162.00
(h) Peritonsillar	70.20
(i) Retropharyngeal	70.20
(2) Adenoidectomy	54.00
(3) Ethmoid operations	
(a) External exenteration	162.00
(b) Intranasal exenteration	108.00
(4) Frontal osteomyelitis, removal of frontal bone	270.00
(5) Frontal sinus operations	
(a) Intranasal operation	108.00
(b) Killian operation	270.00
(c) Lynch operation	270.00
(d) Obliteration operation	270.00
(e) Sewall operation	270.00
(f) Skillern operation	270.00
(6) Larynx operations	
(a) Direct laryngoscopy	70.20
(b) Direct laryngoscopy and biopsy	108.00
(c) Laryngectomy	270.00
(d) Laryngofissure	270.00
(e) Lynch suspension	135.00
(f) Removal of benign growth	135.00
(g) Removal of foreign body	135.00
(7) Malignant disease of sinuses	
(a) Lateral rhinotomy	270.00
(b) Exenteration of orbit	270.00
(c) Moure operation	270.00
(8) Maxillary-antrum operations	
(a) Antrotomy (intranasal)	81.00
(b) Caldwell–Luc operation	162.00
(c) Denker operation	162.00
(9) Nasal polyps, removal	54.00
(10) Nasal-septum operations	
(a) Cauterization	37.80
(b) Setting of fracture	54.00
(c) Submucous resection	135.00
(11) Salivary-gland operations	
(a) Incision and drainage	81.00
(b) Removal of calculus from duct	81.00
(12) Tear-sac (Toti–Mosher) operation	216.00
(13) Tonsillectomy	81.00
(14) Tonsillectomy and adenoidectomy	81.00
(15) Tracheotomy	108.00
(16) Turbinate, submucous cauterization	16.20

c. Ear operations

(1) Brain abscess	270.00
(2) Jugular ligations	270.00
(3) Lateral sinus, drainage of	270.00
(4) Mastoidectomy	
(a) Simple	216.00
(b) Radical	270.00
(5) Fenestration	270.00
(6) Ossiculectomy	162.00
(7) Paracentesis	27.00
(8) Polypectomy	54.00
(9) Postaural abscess, incision and drainage	54.00
(10) Petrositis, drainage	270.00
(11) Foreign body	
(a) In ear canal	27.00
(b) In nose	27.00
(c) In pharynx	37.80

d. Minor treatments

(1) Electrocoagulation of turbinates	16.20
(2) Antrum-wash	27.00
(3) Electrocoagulation of pharyngeal lymphoid tissue	27.00
(4) Biopsy from nose	37.80

e. Consultations (see Internal Medicine)

13. Burns

a. First degree (general practitioner's charges only)

b. Second degree (if first-degree burn is also present there is no extra charge). Pay is according to the following schedules, whichever is lower:

Area sq. in.	Charge
Under 6	$16.20
6–25	27.00
26–50	37.80
51–100	54.80
101–150	81.00
151–200	108.00
201–250	135.00
251–300	162.00
301–400	191.00
401–500	216.00
501 or more	270.00

Day of Care	Charge	Cumulative Charge
1st	$54.00	$54.00
2nd	27.00	81.00
3rd	16.20	97.20
4th	10.80	108.00
5th	10.80	118.80
6th	10.80	129.60
7th	10.80	140.40
8th	10.80	151.20
9th	10.80	162.00
10th	10.80	172.80
11th	10.80	183.60
12th	10.80	194.40
13th	10.80	205.20
14th	10.80	216.00
15th	10.80	226.80
16th	10.80	237.60
17th	10.80	248.40
18th	10.80	259.20

If patient is in hospital over two months, add $50 per week, with no limit.

Children under 5 years pay at double rate for a given area for all second-degree and third-degree burns.

c. Third degree. The basic charge is the same as that for second-degree burns. If both are present, add the two charges. For example, in a patient with a second-degree burn of 75 sq. in. and a third-degree burn of 40 sq. in., the total charge would be $54.00 + 37.80 = 91.80.

Add to this a skin-grafting charge, based on the number of square inches of skin transferred according to the following schedule:

Area sq. in.	Charge
Less than 6	$37.80
6–15	54.00
16–30	81.00
31–60	108.00
61–120	162.00
121–180	216.00
181–250	270.00
251 or more	324.00

14. Plastic surgery

a. Scars, excision and resuture	108.00
b. Plastic operations	
(1) Lip, following cancer, including repair with flaps	162.00
(2) Webbed fingers	162.00
(3) Lop ears	
(a) Single	135.00
(b) Bilateral	162.00
(4) Harelip	216.00
(5) Nose	
(a) Post-traumatic (each operation)	162.00
(b) Following disease	162.00
(6) Neck scars from burns	162.00
c. Cleft palate	
(1) Partial	162.00
(2) Complete	216.00
d. Rhinophyma	162.00
e. Birthmarks	
(1) Face (including hemangioma)	81.00
(2) Body, extensive, including hemangioma (each operation)	108.00

f. Repair following facial paralysis	216.00
(1) Subsequent operation	108.00
g. Arthroplasty (for ankylosis of jaw)	270.00
h. Operation for prognathism of jaw	270.00
i. Operation for retrusion of jaw	270.00
j. Construction of special splints for the last two mentioned operations	108.00
k. Avulsion of scalp (plastic repair) (each operation)	216.00
l. Atresia of nasopharynx (each operation)	216.00
m. Congenital closure of posterior choanae (each operation)	216.00
15. Proctology	
a. Office procedures	
(1) Proctoscopy, with biopsy and pathological examination	16.20
(2) Injection of hemorrhoids	21.60
b. Operations	
(1) Office	
(a) Incision and drainage of abscess	16.20
(b) Excision of single thrombosed hemorrhoid	16.20
(c) Excision of external tab	16.20
(d) Oil injection, fissure	10.80
(e) Removal of papilla	16.20
(2) Hospital	
(a) Hemorrhoidectomy	
(*1*) External	27.00
(*2*) External and internal	81.00
(b) Sphincter dilatation	27.00
(c) Excision of mucous membrane (prolapse)	81.00
(d) Excision of fissure-in-ano	54.00
(e) Incision, simple fistulectomy	108.00
(f) Excision of fissure-in-ano, with dilatation and cryptectomy	81.00
(g) Incision, recurrent of complicated fistula	135.00
(h) Incision of anal stricture	54.00
(i) Incision and drainage of perineal abscess	37.80
(j) Repair of anal sphincter	108.00
(k) Complete prolapse of rectum, cauterization	81.00
(l) Alcohol injection for pruritus	54.00
16. Thoracic surgery	
a. Lungs, pleura and mediastinum	
(1) Pleura, paracentesis, for diagnosis	27.00
(2) Artificial intrapleural pneumothorax	
(a) Initial fill	27.00
(b) All subsequent refills	10.80
(3) Extrapleural pneumonolysis with associated procedures	270.00
(a) Subsequent refills (extrapleural pneumothorax)	10.80
(4) Intrapleural pneumonolysis	
(a) Open thoracotomy	216.00
(b) Under thoracoscopic control, diagnostic or therapeutic	135.00
(5) Phrenic-nerve paralysis (independent operation)	108.00
(6) Empyema	
(a) Closed drainage	108.00
(b) Thoracostomy	162.00
(7) Decortication of lung	270.00
(8) Thoracoplasty	
(a) One-stage operation	162.00
(b) Two or more stages	324.00
(c) Schede operation for chronic empyema	270.00
(9) Pneumonectomy, with associated procedures for any disease	378.00
(10) Lobectomy, with associated procedures for any disease	378.00
(11) Cavernostomy of lung for abscess (one or two stages)	324.00
(12) Thoracotomy	
(a) For mediastinal tumors or cysts (removal)	378.00
(b) Exploratory, for inoperable intrathoracic tumors	270.00
(c) For intrathoracic injuries	324.00
(13) Tumors, trauma or infection of thoracic cage, with resection of one rib or multiple ribs and plastic closure	270.00
(14) Pectus excavatum (operative correction)	270.00
(15) Chest trauma, rib fractures	
(a) Nonoperative treatment	27.00
(b) Operative treatment	216.00
(16) Penetrating wounds of chest (open thoracotomy)	324.00
(17) Thoracotomy for intrathoracic vascular injuries of aneurysm	324.00
b. Heart and pericardium	
(1) Pericardium, paracentesis	54.00
(2) Pericardiostomy	270.00
(3) Pericardiectomy	378.00
(4) Cardiomyopexy	378.00
(5) Cardio-omentopexy	378.00
(6) Cardiopericardialpexy (pericardial poudrage)	216.00
(7) Cardiac suture, post-traumatic	378.00
(8) Foreign body, heart or pericardium, removal of	378.00
(9) Division of patent ductus arteriosus	324.00
(10) Thoracotomy for excision coarctation of aorta	378.00
c. Diaphragm	
(1) Traumatic rupture, repair	270.00
(2) Diaphragmatic hernia, repair	270.00
(3) Hiatus hernia, repair	270.00
(4) Abscess, subphrenic, drainage	162.00
(5) Abscess of liver, drainage	162.00
d. Esophagus and stomach	
(1) Transthoracic gastric resection	378.00
(2) Transthoracic resection	378.00
(3) Transthoracic vagotomy and associated procedures	378.00
17. Physiotherapy	
a. Consultations, office	
(1) Initial	10.80
(2) Subsequent visits — covering such of the following as indicated: long-wave diathermy (approximately 20 minutes); short-wave diathermy (approximately 12 to 16 minutes); ultraviolet ray, water cooled (approximately 10 seconds to 2 minutes) and air cooled (approximately 15 seconds to 13 minutes); negative and positive galvanism (approximately 3 minutes to 20 seconds); slow sinusoidal therapy (approximately 3 minutes to 10 minutes); whirlpool bath (approximately 10 minutes to 15 minutes); radiant heat, 1000-watt lamp or infrared lamp (approximately 20 minutes); cabinet bath (approximately 20 minutes); and test for reaction of degeneration faradic condenser discharge and massage and motion (no time element involved, this depending on co-operation of patient, parts involved, diagnosis, etc.)	5.40
18. Urologic surgery	
a. Cystoscopy	
(1) Observation	21.60
(2) With ureteral catheter	27.00
(3) With ureteral catheter and retrograde pyelogram	37.80
(4) Operative, with fulguration, etc.	54.00
b. Urethrotomy	
(1) Internal	54.00
(2) External	81.00
c. Prostatectomy	
(1) Perineal	189.00
(2) Transurethral	162.00
(3) One-stage suprapubic	162.00
(4) Two-stage suprapubic	216.00
d. Prostatic abscess	54.00
e. Hydrocele	81.00
f. Epididymotomy	54.00
g. Epididymectomy	81.00

h. Vesiculectomy	189.00
i. Repair of varicocele	54.00
j. Orchidopexy	108.00
k. Orchidectomy	
(1) Single	54.00
(2) With lymph-node dissection	108.00
(3) Bilateral	81.00
l. Cystotomy	108.00
(1) With radium, fulguration or removal of calculus	135.00
m. Cystectomy	162.00
n. Cystectomy and ureterointestinal anastomosis (one stage)	270.00
o. Ureterostomy	135.00
p. Ureterolithotomy	162.00
q. Perirenal abscess, incision and drainage	108.00
r. Nephrostomy	162.00
s. Nephrotomy	162.00
t. Nephropexy	162.00
u. Nephrectomy	
(1) Simple	162.00
(2) For tumor	189.00
v. Nephroureterectomy	189.00
w. Pyelotomy	162.00
x. Plastic operation on ureter or renal pelvis	189.00
y. Removal of solitary cyst	162.00
z. Heminephrectomy	189.00
aa. Vesicovaginal fistula	162.00
bb. Perineal fistula	135.00
cc. Amputation of penis	
(1) Partial	108.00
(2) Complete	135.00
(3) With groin dissection	162.00
dd. Hypospadias or epispadias repair	
(1) One stage	216.00
(2) Two or more stages (each stage)	135.00
ee. Meatotomy	21.00
ff. Caruncle excision	54.00
(1) With fulguration	27.00
gg. Perineal implantation of radium, prostate	108.00
hh. Urethral dilatation	10.80
ii. Circumcision	21.60
19. Vascular surgery	
a. Varicose veins	
(1) Unilateral ligation, saphenous	
(a) High, low and multiple	81.00
(b) High, with dissection of perforating veins	108.00
(c) High, with dissection of perforating veins and skin graft	135.00
(2) Bilateral ligation, saphenous	
(a) High, low and multiple	135.00
(b) High, with dissection of perforating veins	189.00
(c) High, with dissection of perforating veins with skin graft	216.00
(3) Office treatment of varicose veins and complications (per visit)	5.40
b. Femoral veins	
(1) Unilateral division	108.00
(2) Bilateral division	162.00
c. Iliac veins	
(1) Unilateral division	108.00
(2) Bilateral division	162.00
d. Inferior vena cava, division of	216.00
e. Procaine sympathetic block	
(1) Lumbar	16.20
(2) Thoracic	27.00

CASE RECORDS OF THE MASSACHUSETTS GENERAL HOSPITAL

Weekly Clinicopathological Exercises

FOUNDED BY RICHARD C. CABOT

TRACY B. MALLORY, M.D., *Editor*

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CASE 32301

PRESENTATION OF CASE

First admission. A sixty-three-year-old steam fitter entered the hospital because of hoarseness.

For years the patient had had a cough productive of small amounts of whitish sputum. A year before entry he began to notice intermittent attacks of hoarseness without accompanying dyspnea or hemoptysis. About the same time he also had a single bout of difficulty in swallowing. The hoarseness progressed for six months, remaining constant thereafter. He had lost about 15 pounds during the preceding two years.

The patient had always been well and strong except for an attack of "pneumonia" thirty years previously.

Physical examination revealed a moderately well nourished man. The larynx showed a thickened right vocal cord covered with whitish hyperkeratotic nodules extending toward the anterior commissure, where a soft polyp was visible. The left cord was slightly injected. The mobility of the larynx on swallowing was not impaired. There were a few, small, nontender cervical nodes. The mid-dorsal spine showed a moderate kyphosis. The chest was emphysematous, with increased anteroposterior diameter. One observer thought that it was slightly smaller on the left than on the right and that it lagged somewhat during respiratory movement. There were a few scattered rales over the left upper lung field. The diaphragm moved well. The heart appeared to be slightly enlarged, with both systolic and diastolic murmurs at the base and apex. The abdomen and extremities were normal.

The temperature, pulse and respirations were normal. The blood pressure was 108 systolic, 94 diastolic.

Examination of the blood showed a red-cell count of 3,980,000, with 12.2 gm. of hemoglobin, and a white-cell count of 5300, with 56 per cent neutrophils, 36 per cent lymphocytes and 6 per cent monocytes. The sedimentation rate was 30 mm. in thirty minutes, and 48 mm. in sixty minutes. Examination of the urine was negative.

An x-ray film of the chest revealed an area of infiltration in the left apex and considerable thickening in the left hilus. A sputum smear was negative for acid-fast organisms. A biopsy of the right vocal cord was reported as showing a Grade II epidermoid carcinoma. The patient was discharged to be readmitted for total laryngectomy.

Second admission (one month later). Another x-ray film of the chest revealed infiltration in both apexes that was interpreted as "probably active." Two sputum smears were negative for acid-fast organisms, but guinea-pig inoculation gave a positive reaction.

The patient was discharged to a sanatorium.

Third admission (three months later). Since the patient's tuberculosis was thought to have been arrested, he was admitted for total laryngectomy. Physical examination and x-ray study of the chest were essentially the same as on the previous admission. The operation was uneventful. The pathological report was Grade II epidermoid carcinoma, with metastases to regional lymph nodes.

The patient did well postoperatively, receiving 24,000 units of penicillin every three hours for thirteen days. On the fifteenth postoperative day, while sitting on the toilet, he was suddenly seized by an extremely severe pain in the epigastrium. He motioned for help, and while being assisted back to the ward, he collapsed on the floor. He was pale, writhing in pain and sweating profusely. When queried about the location of the pain, he repeatedly pointed to the epigastrium, chiefly in the midline. The lips had a grayish hue. He vomited a small amount of coffee-grounds material. Examination of the chest revealed only a few rhonchi at the left base. The heart had not changed since the previous examination. The abdomen was spastic throughout, particularly in the epigastrium. There was also exquisite rebound tenderness throughout, most marked in the left upper quadrant and midepigastrium, and referred from the right lower quadrant to below the xiphoid. Peristalsis was absent. No masses could be made out. There was no arm, shoulder, chest or neck pain. Pain was not increased by respiration, and there was no cough. When asked specifically, the patient denied that there was an element of substernal compression, tightness in the chest or difficult breathing. It was deduced by devious questioning — to which he could only indicate assent or negation — that the pain was constant, unremitting, nonradiating and of great severity, that it was unassociated with a desire to urinate or defecate and that its location was strictly in the upper abdomen.

Examination of the blood showed a white-cell count of 16,100. A stool specimen obtained during rectal examination was guaiac positive.

An x-ray film of the chest showed mottled areas of increased density in both lower lung fields, in addition to calcified areas at the apexes. The vascular

shadows were prominent in both hilar regions, and there appeared to be some haziness in the right upper mediastinum. The abdomen showed no evidence of dilated loops. There were a small amount of gas and much fecal material in the large bowel.

An electrocardiogram showed evidence of chronic coronary disease but none of an acute process.

An operation was performed.

Differential Diagnosis

Dr. Oliver Cope: Of course, from the record, only one thing can explain the situation. The patient had an operation and survived. The one lesion that fits with that history is a perforated peptic ulcer. That diagnosis may be too easy, and therefore I had better see the x-ray films.

Dr. James R. Lingley: These first two films, taken at the Eye and Ear Infirmary one month apart, show emphysema and a process at the apex on both sides, more extensive on the left than on the right. It is a hazy type of infiltration. This film, taken just before the abdominal operation and fifteen days following laryngectomy shows a high diaphragm on both sides and density at both bases, which could be explained by atelectasis from a high diaphragm, and the same process in the apexes. The film of the abdomen shows extensive calcification of the abdominal aorta and the internal iliac arteries. There is an area of calcification over the upper pole of the left kidney, which is interesting in view of the findings in the chest. Unfortunately, we do not have a lateral view, so that I cannot be sure that it is a calcified adrenal gland; in the anteroposterior view the calcification is in the proper position for it, but the explanation may be an overlying calcified lymph node.

Dr. Cope: They should have written that into the record to make it harder. Is there any evidence of air under the diaphragm?

Dr. Lingley: Since the films were taken in a prone position, I cannot rule out air under the diaphragm.

Dr. Cope: I say that this was a perforated lesion of the upper gastrointestinal tract because that complication occurs not too infrequently following a major surgical procedure — often enough to be something of which everyone should be aware. The pain, of course, was not typical of anything other than severe irritation, and it may turn out that the patient had a ruptured aortic aneurysm. I assume that he made some effort at the toilet, which was the final push that ruptured something. Effort to defecate could result finally in perforation somewhere in the intestinal tract. Such effort could rupture an abscess or could be the initiating cause of rupture of an aneurysm or of rupture through a weak place somewhere along the aorta. The upper abdominal pain is the typical place for pain to radiate in rupture of the thoracic aorta. Usually, at least in the few patients I have had an opportunity to see in the differential diagnosis of a surgical lesion, the pain starts not so abruptly, developing quite quickly to a high pitch, however. I shall exclude dissecting aneurysm of the aorta as a diagnosis, because in all probability the patient would not have survived it.

Abdominal tenderness and pain in the epigastrium can of course be produced by a lesion in the chest in the region of the sixth to ninth costal nerves. One can be misled by a lesion in the chest; the abdomen has often been opened for disease above the diaphragm. On the other hand, peristalsis was absent, and there was coffee-grounds material in the stomach, with a positive guaiac test in the stools, which suggest that the lesion was within the gastrointestinal tract. Also, the x-ray studies are not compatible with an abscess of the lung. I have never seen a tuberculous abscess rupture down through the diaphragm. There is only one infectious disease that does go down through the diaphragm — actinomycosis. Subdiaphragmatic abscesses frequently rupture upward through the diaphragm into the chest, but the reverse is rare, except in actinomycotic lesions, actinomycosis being no respecter of anatomic barriers. Tuberculosis, on the other hand, is a respecter of anatomic partitions and does not go downward ordinarily; I shall exclude tuberculosis of the lungs as the cause of this acute painful episode, on the basis of this last chest film, which I interpret as negative so far as the lungs are concerned, and also on the findings related to the abdominal organs.

What about the primary diagnosis that I mentioned — a perforated peptic ulcer? From the history the man had had no ulcer symptoms or indigestion, but the latter might have been missed because of the fact that after laryngectomy there is a problem in feeding and that with any symptoms referable to an acute ulcerative process in the stomach and duodenum, the upper small intestine might easily be missed. Various symptoms have been overlooked in such complicated feeding problems. Acute ulcer of the upper gastrointestinal tract, so-called "peptic ulcer," is not an infrequent lesion following trauma of various sorts. The classic description is Curling's ulcer, the type that follows burn trauma. It also follows other kinds of trauma and acute adrenal insufficiency. Because of the latter I wonder why the finding of the X-ray Department was not recorded; the presence of calcification in an adrenal gland suggests old tuberculous damage. The patient might well have had some degree of adrenocortical insufficiency or failure to respond to operative treatment in a way that would result in what one might call subclinical shock, which could have been the initiating factor of the ulcer. This type of ulceration has received a great deal of attention recently regarding the so-called "alarm reaction,"* which occurs with hemoconcentration, and this man may have had hemoconcentration following laryn-

*Selye, H. General adaptation syndrome and diseases of adaptation. *J. Clin. Endocrinol.* 6:117-230, 1946.

gectomy. He had chronic tuberculosis of the lung, which may have prevented a good response to treatment like that of a healthy vigorous person; he had two strikes against him to begin with.

I have stuck my neck out a long way. I have even gone prematurely into a historical account of acute gastrointestinal ulcer following trauma, but I have done so because I do not see any other alternative. I should expect the ulcer that perforated to have been in the stomach or, more probably, in the duodenum. It may have been multiple. Dr. Castleman, you will recall that you and Dr. John Bradley had a case several years ago in which on the eighth postoperative day one ulcer perforated at 2:00 a.m., a second at 4.30 a.m. and later a third, which was not recognized clinically but which was found at post-mortem examination. Multiple ulcers are a possibility in the case under discussion.

DR. BENJAMIN CASTLEMAN: Are there any comments or other suggestions?

DR. WALTER BAUER: A perforated peptic ulcer is a likely explanation of the episode of acute pain.

DR. CASTLEMAN: Dr. Dahl, will you tell us what your impression was?

DR. LEWIS K. DAHL: From the medical standpoint we went through approximately the same process of reasoning as that of Dr. Cope. We favored a vascular accident rather than a perforated viscus. We thought that the only hope of survival lay in the possibility of a perforated viscus and therefore believed that operation was indicated. I think that the surgical men favored a perforated viscus, but it is fair to say that no one considered the actual condition.

CLINICAL DIAGNOSIS

Perforated peptic ulcer.

DR. COPE'S DIAGNOSES

Perforated peptic ulcer.
Chronic pulmonary tuberculosis.

ANATOMICAL DIAGNOSIS

Negative abdominal exploration.

PATHOLOGICAL DISCUSSION

DR. CASTLEMAN: The abdominal exploration was entirely negative. You may have another chance, Dr. Cope.

DIFFERENTIAL DIAGNOSIS (Continued)

DR. COPE: The medical side passed it up, and the thing I want to stress again is that the patient survived. That is what puzzles me. It is not in the record, but I assume that the patient survived the operation as well as the lesion that gave rise to the pain.

DR. CASTLEMAN: The patient did die — about twenty-four hours after operation.

DR. COPE: That makes it somewhat easier because, as I said at the outset, the only curable lesion that I could think of was a perforated peptic ulcer, which was sutured at operation, but I cannot imagine survival with a dissecting aneurysm of the aorta. I suppose that the patient could have survived, but this came on acutely and I suspect that it eventually led to death. I do not know enough about that, however.

To go back to the tuberculosis, there was undoubtedly active tuberculosis in the chest. I cannot believe that there was a rupture of an abscess, with formation of empyema. There was no displacement of the mediastinum, no cough and no increase in pain on respiration. The record also does not suggest that an abscess had ruptured into a bronchus. In other words, I do not find evidence of an abscess that broke into a pleural space. I can find nothing pointing to the abdomen, and that is substantiated by the fact that the abdominal laparotomy was negative. I cannot go any farther with tuberculosis of the lung.

A negative electrocardiogram at such a stage, if my understanding is correct, does not exclude a coronary infarction. The electrocardiographic changes may not become positive (I hope that I shall be corrected if I am making a wrong statement) for three or four days or possibly longer. This could have been coronary occlusion, because absence of the left arm radiation and absence of substernal tightness or compression do not exclude a coronary lesion. I must go back to a vascular lesion to explain this episode, and I do not know whether it was a lesion of the aorta — a dissecting aneurysm of the thoracic aorta — or a coronary accident.

DR. CASTLEMAN: The field is still wide open.

DR. COPE: Dr. Bauer; you must have an opinion on this.

DR. BAUER: I am stumped.

DR. COPE: I am glad we have that in the record.

CLINICAL DIAGNOSIS

Gastrointestinal hemorrhage, cause undetermined.
Pancreatitis?

DR. COPE'S DIAGNOSIS

Dissecting aneurysm of aorta?
Coronary thrombosis?

ANATOMICAL DIAGNOSES

Acute fibrinopurulent mediastinitis.
Acute fibrinopurulent pleuritis.
Chronic pulmonary tuberculosis.
Carcinomas of stomach and sigmoid.
Chronic tuberculosis of left adrenal gland, with calcification.
Operation: total laryngectomy for epidermoid carcinoma of larynx.

PATHOLOGICAL DISCUSSION

DR. CASTLEMAN: Before I call on Dr. Schall to discuss the operation, let me tell you what was found

at autopsy. Surrounding the posterior aspect of the esophagus from about the fourth to the eighth thoracic vertebra, we found an acute mediastinitis; there was about 150 cc. of foul-smelling fibrinopurulent material. This surrounded the posterior aspect and both sides of the esophagus and extended into both pleural cavities. We found 700 cc. of purulent fluid in the left chest. This abscess of the posterior mediastinum extended downward forming a channel into the right pleural cavity. It also extended upward, but not so far up as the tracheotomy. There was no connection between the tracheotomy and this infection of the posterior mediastinum. We asked Dr. Schall about this complication of laryngectomy, and he is here to tell us about it.

Dr. Leroy A. Schall: The fatal complications of total laryngectomy are hemorrhage and sepsis. The sulfonamides and the antibiotics have practically eliminated infection as a complication, and this is the first case of serious infection since the introduction of these agents. In 106 cases of total laryngectomy, death occurred in only 3 cases, including this one, from infection. Our patients are put on 24,000 units of penicillin every three hours. With this patient penicillin was given for twelve days. Clinically he did exceptionally well. His temperature was normal, the wound healed by first intention, and he was about ready to be discharged.

I believe that it is important in doing a laryngectomy to avoid, so far as possible, opening the fascial planes to the mediastinum. The posterior attachment of the trachea to the esophagus is not disturbed. For this reason I do not do the so-called "pull-through" operation, whereby the trachea is freed and pulled through a buttonhole incision.

You may well understand that many patients with cancer of the larynx are poor surgical risks. This patient's tuberculosis delayed the operation.

The lesson in this case was that of infection masked by penicillin.

Dr. Castleman: There was no evidence of tuberculosis in the mediastinum, although tuberculosis in the lungs was still quite active. There was calcification of the left adrenal gland, due to old tuberculosis. Following operation a gastric hemorrhage occurred, which proved to be due to carcinoma of the stomach; there was also a carcinoma of the sigmoid.

Dr. Cope: I gambled on the knowledge of Dr. Schall's excellent operative record, but I should have considered mediastinitis on the basis of the x-ray film.

Dr. Lingley: There is nothing distinctive in that film. There was a high diaphragm which is consistent with mediastinitis.

Dr. Bauer: There is not much in the record to suggest sepsis.

Dr. Schall: Nor was there any history of sepsis.

Dr. Castleman: Would you agree on the apparent masking of the infection by the penicillin?

Dr. Bauer: Yes. The penicillin was stopped on the thirteenth day, and the episode occurred on the fifteenth day. There was nothing in the history to indicate the presence of infection, and I also thought that the subsequent widening of the mediastinum was due to a high diaphragm. That was consistent with Dr. Cope's original diagnosis. If I had discussed the case I still should have made the same diagnosis as Dr. Cope did — perforated peptic ulcer — and obviously should have been wrong.

CASE 32302

Presentation of Case

A sixty-five-year-old widow entered the hospital because of severe dyspnea.

For over a year the patient had had a chronic cough productive of thin sputum, which was never bloody. She was also thought to have lost some weight. Five weeks before entry she consulted a physician because of these symptoms. She was found to be emaciated, weighing 101 pounds. X-ray study showed the heart to be enlarged, and an aortic diastolic murmur was heard. Some inflammation of the throat and larynx was present, but there was no x-ray evidence of pulmonary disease. The blood pressure was within normal limits, and the urine was normal. A week before entry the patient noted swelling of the ankles, and three days later she appeared so thin and exhausted that she was put to bed. Her physician prescribed aminophyllin tablets. She began to cough up heavy yellowish sputum and ran a temperature ranging between 99 and 101.6°. She also complained of discomfort along the right costal margin on coughing, but she had no chills and no sharp pain intensified by inspiration. About twenty-four hours before entry she became progressively more dyspneic.

On physical examination, the patient was somewhat pale, emaciated and markedly dyspneic, with moderately cyanotic lips and audible tracheal rales. She spoke in almost unintelligible snatches between breaths and appeared somewhat confused. Most of the history had to be obtained from a companion. She was in no greater discomfort when lying on her side or with her back at 30° than when sitting upright. The left pupil was somewhat larger than the right, and both pupils appeared slightly irregular. The heart was enlarged, the area of dullness extending to the midaxillary line on the left. The sounds were strong but partially obscured by loud respiratory noises. No murmur or gallop rhythm was made out. The radial pulses were weak and thready, with occasional irregularities. The chest showed restricted expansion on the right. There was dullness to flatness on percussion over the right

lower lung field both anteriorly and posteriorly. Coarse, moist rales were heard throughout the other portions of the chest. The upper abdomen was markedly resistant to palpation, but there was apparently no tenderness and no masses were made out. The extremities were somewhat weak, and there was ++ pitting edema over the lower legs.

The temperature was 100.5°F., the pulse 140, and the respirations 25. The blood pressure was 105 systolic, 70 diastolic.

Examination of the blood showed a white-cell count of 43,200, with 90 per cent neutrophils and a marked shift to the left. No toxic granules were seen. The platelets and red cells appeared normal. Blood cultures were negative. The urine had a specific gravity of 1.020 and showed a + test for albumin; the sediment contained many bacteria and 10 white cells per high-power field.

The patient was given Cedilanid and oxygen, and tourniquets were applied with considerable clearing of the moisture in the left chest and recession of the cardiac apex to the anterior axillary line. Nevertheless she gradually lapsed into shock and stupor. Neo-Synephrine had no appreciable effect on the blood pressure. The respirations became progressively shallower and slower. She died eleven hours after admission.

Differential Diagnosis

Dr. John Graham: It seems obvious to me that, whatever else this patient had, she had heart disease. This is attested to by two sets of significant findings, — those of x-ray examination and those of physical examination, — both of which indicated that the heart was enlarged. The other symptoms, such as dyspnea, edema and cough, can conceivably be attributed to other diseases, but that much enlargement of the heart in the absence of severe anemia — and we are told that the red cells appeared normal — indicates serious heart disease. The question in this case is whether there was some lesion in addition to the heart disease.

Several factors suggest that more than cardiac disease was present. The cough with thin sputum might have been consistent with cardiac disease alone. X-ray examination was negative, so far as the lungs were concerned. When she really began to get sick, however, just before coming to the hospital, she began bringing up thick yellow sputum and at the same time began to have a fever as high as 101.6°F. and pain in the right chest. On physical examination she had dullness and flatness throughout the right chest, with limited motion and some pain, and dyspnea in all positions. These facts are not particularly characteristic of cardiac decompensation and suggest a further cause for the dyspnea and cough. When treatment for congestive failure was given, the signs in the left chest cleared fairly well but the findings in the right chest were not improved.

The white-cell count was 43,000, with 90 per cent neutrophils and a marked shift to the left, which is suggestive of acute infection. One wonders if the patient had leukemia, but there is no indication that there were any really young cells or any enlargement of the lymph nodes, liver or spleen, although examination of the abdomen was rather difficult. I shall exclude that possibility and take the high white-cell count with the high percentage of neutrophils and the shift to the left as an indication of acute infection. In other words, I am inclined to think that an acute infectious process was going on in the chest, which was possibly an added complication to the existing cardiac condition.

As for the pulmonary infection, one wonders about bronchiectasis, with a history for a year. Opposed to that are the completely negative lung fields by x-ray study and the fact that five weeks before admission the sputum was not particularly characteristic. One wonders about carcinoma obstructing a bronchus, with infection beyond the obstruction. Again the negative x-ray findings argue against that possibility. With sudden and complete signs developing rather quickly, one wonders about lung abscess, which can be excluded, however: the sputum was not characteristic, and there was no suggestion of the signs and symptoms that are apt to precede a lung abscess. One wonders about an infarct, but with an infarct that gave so many signs in the chest over such a large area one would expect bloody sputum and a more sudden collapse than this story implies. It is much more probable that this patient had beginning congestive failure, with a superimposed acute infection of the lungs — a pneumonitis of one sort or another — and, possibly, some fluid in the pleural space. I rather think that the pneumonia was the final straw that broke the camel's back.

That brings up the question of the heart lesion, whose nature depends somewhat on the findings given. For instance, we are told that five weeks before entry, on examination by an outside physician, an aortic diastolic murmur was recorded. Later, on admission to the hospital, no murmurs were heard. It is important to realize that at that time the record goes out of the way to say that the patient had a noisy chest and rapid pulse (140) and was in a critical state. A definite aortic diastolic murmur was probably heard when there was a good opportunity to listen to the heart under normal conditions. I therefore believe that the heart was enlarged, with aortic regurgitation.

When these facts are put together one is led to consider three main types of heart disease. The first is rheumatic heart disease, with aortic regurgitation, but such a lesion would probably have caused trouble before the age of sixty-five. One might suppose that the whole picture was explained by an acute attack of rheumatic fever, unusual but

still possible in older people, superimposed on an already damaged rheumatic heart, but such an explanation is unlikely statistically. The second type is hypertensive arteriosclerotic heart disease, in which aortic regurgitation is sometimes found with dilatation of the heart. To be sure, the patient had no hypertension during the time she was observed, but we know that such patients may have a low blood pressure when the heart begins to fail. I am inclined to discard that diagnosis because one finding suggests a third type of heart disease, namely, syphilitic heart disease. To be sure syphilitic heart disease is more usual in the forties and fifties, but it does occur in the sixties and seventies. It is about five times as frequent in men as in women. There are some things, however, in favor of syphilitic heart disease in this case. The patient had a cardiac condition that progressed to death in the course of a year from the time it was first noted or from the time of the first symptoms. She had an aortic diastolic murmur, which is consistent with syphilitic aortitis, and she died of cardiac asthma or pulmonary edema, which is a characteristic end in syphilitic heart disease. She also had unequal and irregular pupils. There is a definite association between central-nervous-system and cardiovascular syphilis. I believe that 10 to 20 per cent of the people with cardiovascular syphilis also have central-nervous-system syphilis. What the percentage is in the reverse situation, I do not know. I think that this patient had syphilitic heart disease, although we are not given the results of a blood Hinton test. Having decided that, one can ask whether an aneurysm developed and blocked off a bronchus to produce the chest findings. In view of the negative x-ray study for aneurysm five weeks before entry, it is too much to suppose that an aneurysm of these proportions would have developed within the short time before the patient entered the hospital. One can wonder about coronary closure, which occurs in syphilis at the mouth of the coronary artery, but preceding this attack of failure there was no history of pain and coronary closure is therefore unlikely.

I shall conclude by making the following diagnoses: syphilitic heart disease, with aortic regurgitation; cardiac decompensation, with pulmonary edema; right pleural effusion, possibly secondarily infected; pneumonitis in the right lower and middle lobes; and syphilis of the central nervous system.

Dr. William D. Smith: This patient was sent to me in my office almost five weeks before she came to the hospital. The history was interesting because the only complaint was cough, which was at first paroxysmal, occurred mostly in the morning and had grown steadily worse until, for two weeks, it had kept her awake almost all night, in spite of the fact that she was taking cough medicine, which her own physician had given her. Another interesting thing was that two months before admission she had a wheeze, which persisted for two weeks and ended in a tremendous paroxysm of cough in which she raised a small hard mass of something that nobody could identify.

Dr. Walter Bauer: Was the wheeze bilateral?

Dr. Smith: I do not know about that. She said that about two months previously she wheezed almost constantly, but the wheezing ceased after the coughing paroxysm, with the extrusion of the small hard lump. So far as the heart is concerned she had no failure at the time I saw her, although she did have a moderately enlarged heart. She had a systolic and an early, blowing diastolic murmur at the apex. The heart rate was regular, and she had no signs of chronic passive congestion and never admitted any shortness of breath, except during the paroxysm of cough.

I could not find anything in the chest. She coughed a great deal in the office — it was a dry hard cough. We tried to get sputum and did get an infinitesimal amount of mucus. She had been checked two or three weeks earlier at another hospital, but in spite of the fact that she had had an x-ray examination three weeks before I saw her, I had another x-ray film taken, which was negative. Because of the hoarseness, which I supposed was due to chronic cough, I had a nose-and-throat man examine the larynx and trachea, which he reported showed only extreme redness. The blood pressure was within normal limits, and the urine was normal. My opinion was that, in addition to the heart that had given no symptoms, the patient almost surely had disease of the lung. I wanted her to come in to the hospital for further study, but she went to Philadelphia to visit her sister, and the next time that I heard from her, her physician telephoned that she was in cardiac failure; she was sent to the hospital in a moribund condition. I thought that she must have had some lung disease that had not been discovered. She had no pain in the chest and no hemoptysis.

Dr. Bauer: She had an aortic murmur.

Dr. Smith: Yes. The heart was moderately enlarged. She had a systolic murmur at the apex and a rather faint but definite early aortic diastolic murmur, which I could hear at the apex much better than elsewhere.

Dr. Graham: I am impressed with the first-hand description of the cough. It seems to me to have been a much more prominent feature for a longer time than I had gathered from the record. I am also impressed by the fact that if it had been on a cardiac basis Dr. Smith would have detected more evidence of cardiac failure at the time he saw the patient. The degree of cough is the most striking thing he described and raises the question whether this patient had adenoma of the bronchus, which did not show in the x-ray film but finally plugged the bronchus and gave rise to a secondary infectious process.

Clinical Diagnoses

Arteriosclerotic heart disease, with congestive failure.
Pulmonary edema and right pleural effusion.
Bronchopneumonia, extensive.

Dr. Graham's Diagnoses

Syphilitic heart disease, with aortic regurgitation.
Congestive heart failure.
Chronic pneumonitis, right.
Pleural effusion.
Central-nervous-system syphilis?

Anatomical Diagnoses

Empyema, right.
Lung abscess, right lower lobe.
Chronic pneumonitis, right lower lobe.
Broncholiths, with ulceration of right and left bronchi.
Tuberculosis, calcified, of bronchial lymph nodes.
Traction diverticulum of esophagus.

Pathological Discussion

Dr. Benjamin Castleman: Autopsy showed empyema of the right pleural cavity — 1200 cc. of foul-smelling purulent material. In removing most of this fluid we discovered that it had developed from a small abscess in the right lower lobe. The abscess was rather well defined, measuring 2 to 3 cm. in diameter. Around the abscess, involving the greater part of the right lobe, was a chronic pneumonitis. The remaining lobes, which appeared perfectly normal, were not congested to any extent.

The interesting thing about this case is the cause of the lung abscess. Scattered over the mucosa of the lower trachea and both bronchi were about five or six irregular foci of black anthracotic pigmentation. These areas were closely related to calcified anthracotic mediastinal lymph nodes adherent to the wall of the trachea and bronchi, and in each bronchus just beyond the carina a calcified node had eroded through the mucosa and presented in the lumen. The larger protruding calcified mass measured about 1 cm. in diameter. We were unable to find a calcified mass in the abscess. Perhaps the mass that produced the abscess was the one the patient coughed up. I believe that the chronic pneumonitis and abscess originated from one of these so-called "broncholiths."

We were unable to find any evidence of active tuberculosis anywhere. There were scars at the apexes, evidence of old tuberculosis, and the regional nodes showed calcification. The calcified lymph nodes had also produced a traction diverticulum of the esophagus.

The heart was not remarkable: it weighed only 325 gm., the valves were normal, and coronary arteries showed extremely little sclerosis.

Dr. Bauer: There was no evidence of valvular disease?

Dr. Castleman: No.

A Physician: That does not explain the inequality of the pupils.

Dr. Castleman: We did not examine the head.

It is strange that nothing was discovered in the right lower lobe when the patient was examined five weeks previously, because the pneumonitis was chronic. Many of the bronchi were plugged with connective tissue reminiscent of bronchiolitis fibrosa obliterans, and some of the small arteries in that region were plugged with thrombi such as one might see in an old infection.

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THE TREATMENT OF BACTERIAL MENINGITIS

There is a general impression among a great many physicians that the recent introduction of potent antibacterial agents, including the sulfa drugs and particularly penicillin, has rendered bacteriologic diagnosis unnecessary and obsolete. This impression is fostered and strengthened by the necessity for the early use of these agents to obtain the optimum effect in the treatment of infections and also by the fact that cultural results are so often meaningless if materials are obtained for examination after these forms of antibacterial therapy have been given for any length of time. The fallacies in this reasoning and the practical importance of early and proper bacteriologic diagnosis of infections prior to treatment with modern chemotherapeutic and antibiotic agents are most strikingly illustrated in a group of the most serious infectious diseases, namely, the bacterial meningitides.

Elsewhere in this issue of the *Journal* there is a report of the treatment of 9 cases of *Haemophilus influenzae* meningitis. In 7 of these cases, cure of this infection was attributable solely to the use of the new antibiotic streptomycin. The results in these cases and the experience of others in similar cases seem to justify the conclusions that at the present time streptomycin is the best treatment for this type of meningitis and that the antibiotic should be given both intrathecally and intramuscularly.

Prior to the introduction of streptomycin, comparable results were obtained in cases of meningitis caused by Type B strains of *H. influenzae* by the use of specific rabbit antiserum supplemented by sulfonamides. This form of treatment should still be considered as a useful alternative when streptomycin is not available or when treatment with the antibiotic is not effective. The latter possibility may prove to be an important and serious one because the development of resistance or "fastness" during the course of treatment of infections due to organisms that were originally susceptible to streptomycin has already been encountered more frequently with this antibiotic than with any of the other antibacterial agents now in use.

Two of the 9 reported cases of *H. influenzae* meningitis were complicated by severe *Staphylococcus aureus* infections, which occurred after the patients were completely free of *H. influenzae*. It was necessary to resort to full doses of penicillin for the treatment of these staphylococcal infections and a cure was effected in one of the cases by such therapy. The fact that recovery would probably not have occurred without penicillin in this case is further proof of the usefulness of bacteriologic studies. The data derived from bacteriologic studies are therefore useful not only in determining the optimum therapy but also, together with the clinical findings, in helping to establish the causes of failure.

Thus it has been shown that meningococcal meningitis is best treated by parenteral or oral sulfonamides and that penicillin is probably unnecessary, although it may be used as an adjunct in severe bacteremic cases. Penicillin alone, even when

given parenterally and intrathecally, has frequently been found to be inferior to sulfonamides in cases of meningococcal meningitis. In cases of hemolytic streptococcus infection the sulfonamide drugs alone may also be adequate. In such cases, however, there seems to be more justification for the use of penicillin because of the marked sensitivity of most strains of hemolytic streptococci to penicillin and because of the recent increase in the number of sulfonamide-resistant strains of this organism. Cases of pneumococcal and staphylococcal meningitis require the combined use of sulfonamides and penicillin, the latter being given both parenterally and intrathecally. The necessity for this combined treatment is based on the reported results in clinical cases and also has some experimental basis. Meningitis due to gram-negative bacilli usually does not respond well to treatment with sulfonamides alone, and penicillin generally has no effect whatever in these cases. Streptomycin given parenterally and intrathecally offers the best hope in such cases, although proof of the value of this agent in meningitis is not yet available except in cases due to *H. influenzae*. The necessity for intrathecal therapy with streptomycin, as with penicillin, is based on the poor penetration of these antibiotics into the cerebrospinal fluid. The duration of treatment is also dependent on the causative agent and varies from a brief period of perhaps two or three days after sterilization of the spinal fluid in cases of meningococcal meningitis to as long as three weeks or even longer in cases of staphylococcal meningitis.

In addition to these pyogenic infections of the meninges, cases of syphilitic meningitis have now been shown to respond to treatment with penicillin. Parenteral therapy is adequate, intrathecal therapy not only being unnecessary but also often resulting in serious reactions. There is also one case of apparent recovery following systemic and intrathecal treatment with streptomycin in a proved case of tuberculous meningitis.*

The best practical procedure to be followed when one is confronted with a clinical case of meningitis is to obtain the materials for bacteriologic study as soon as the diagnosis is made or suspected. One may then proceed immediately with therapy along the lines suggested by the likeliest clinical diagnosis. A change to the optimum treatment is then made after the etiologic diagnosis is established from the cultures of the blood or spinal fluid. The proper choice of antibacterial agent, dosage and route and duration of therapy, as well as the prognosis, all depend on the etiologic diagnosis. Further cultural studies are indicated in following the course of the infection, particularly when the response of the patient, as judged from the clinical and laboratory observations, seems inadequate.

*Cooke, R. E., Dunphy, D. L., and Blake, F. G. Streptomycin in tuberculous meningitis: report of its use in one-year-old infant. *Yale J. Biol. & Med.* **18**:221-226, 1946.

THE FIRST DESCRIPTION OF RICKETS

Just over three hundred years ago, in 1645, a young man, formerly a student at Merton College, Oxford, finished a course of medicine at the University of Leyden and was given a medical degree. As usual, he was required to write a graduation thesis. This was read in Latin before his examiners at Leyden on October 18, 1645, by Daniel Whistler, then twenty-five years of age. In the title he used the English word "rickets," thus publishing for the first time, so far as is known, the name that the disease still bears. It is not quite clear where this name came from. Whistler stated that the disease had been observed in England for at least twenty-five years and that the name was said to have been taken from the surname of a quack who was the first to treat the condition. Others have pointed out that this fanciful name arose in the county of Dorset, where those who are short of breath are said, in the dialect of the district, "to rucket." Wherever the name originally came from, the addition of it to medical literature is due to the medical student, Daniel Whistler.

Whistler's description of the disease is a concise and clear statement of most of the then known facts and, according to Still,[1] appears to have been based on personal observations. As Whistler did no post-mortem examinations, his description of the pathology of rickets is purely speculative. Still believes that Whistler may have known of the incomplete description of rickets published by Reusner in 1582, but Whistler's description was almost certainly the result of personal contacts with patients and not

simply the copying of material from a previous author.

The thesis had little influence on the development of knowledge of this condition, for it was not until Francis Glisson and a committee of seven at the Royal College of Physicians in London investigated the disease and published their report in 1650 that rickets was accepted as a clinical entity.

Whistler's later career was not a happy one. After returning to London from Leyden, he received his medical degree at Oxford in 1647 and became a fellow of the College of Physicians two years later. He then practiced medicine in London, but his interests were widespread since he taught geometry at Gresham College and served as a Linacre Reader at Oxford. Whistler served as a naval surgeon and later traveled in Sweden. Honored by being elected as the Harvey Orator in 1659, he ultimately rose to the office of treasurer and finally that of president of the College of Physicians. Both Samuel Pepys and John Evelyn, the diarists, were friends.

It was toward the end of his life that Daniel Whistler got into difficulties, and after his death Munk,[2] the historian of the Royal College of Physicians, wrote: "Whistler's character will not bear examination; and it would have been well for the interest of the College had he not admitted to some, at least, of the places of trust he was elected to fill. His manners were agreeable and he shone particularly in society; yet it is but too evident that duty, honor and probity weighed but lightly with him." He apparently handled the financial matters of the College of Physicians badly and probably misappropriated some of the funds. He is said to have married a rich widow. His extensive practice in London brought him in a thousand pounds a year, a large sum for the middle of the seventeenth century, and yet he died in debt, with a blot on his name, which cannot be erased even after three hundred years. He should be remembered, however, for his account of rickets, which established the name of the disease, although at the time his medical thesis from the University of Leyden attracted little attention. Whistler, no doubt, resented this, particularly since so much recognition had been given to Glisson; as a result he had his thesis reprinted in London in 1684, shortly before his death.

References

1. Still, G. F. *The History of Paediatrics. The progress of the study of diseases of children up to the end of the XVIIIth century.* 526 pp. London: Milford, 1931.
2. Munk, W. *The Roll of the Royal College of Physicians of London.* 3 vol. Second edition. 1435 pp. London: Harrison & Son, 1878.

MISCELLANY

NOTES

The following appointments to the teaching staff of Harvard Medical School have recently been announced: Frank Dennette Adams, of Boston (Lit. B. Princeton University 1913, M.D. Harvard University 1917), instructor in medicine; Marshall Kinne Bartlett, of Dedham (A.B. Yale University 1924, M.D. Harvard University 1928), instructor in surgery; Joseph Henry Bragdon, of Milton (A.B. Yale University 1935, M.D. Columbia University 1939), instructor in pathology; Joseph Messer Clough, of New London, New Hampshire (A.B. Dartmouth College 1931, M.D. Jefferson Medical College 1936), assistant in ophthalmology; David Wesley Compton, of Vashon, Washington (S.B. University of Washington 1937, M.D. University of Pennsylvania 1941), assistant in anesthesia; Geoffrey Edsall, of Cambridge (M.D. Harvard University 1934), instructor in bacteriology and immunology; Milton Elkin, of Andover (A.B. Harvard University 1937), M.D. Harvard University 1941), assistant in medicine; Robert Goldstein, of Dover, New Jersey (A.B. Princeton 1933, M.D. Harvard University 1937), assistant in medicine; James Hutcheson Graham, of Westmount, Quebec (M.D.C.M. McGill University 1942), assistant in medicine; William Frederick Greenwood, of Toronto, Ontario (M.D. University of Toronto 1937), research fellow in physiology; Lorye Edward Hackworth, of Sheffield, Alabama (S.B. Florence, Alabama, State Teachers College 1936, S.M. University of Alabama 1938, M.D. Harvard University 1943), assistant and Arthur Tracy Cabot Fellow in Surgery; George Kelemen, of Boston (M.D. University of Budapest 1913), instructor in otology; Wyland Fenway Leadbetter, of Needham (S.B. Bates College 1928, M.D. Johns Hopkins University 1932), assistant in genitourinary surgery; Arthur Paige Long, of Needham (S.B. University of Iowa 1932, M.D. University of Iowa 1934, M.P.H. Harvard University 1937, D.P.H. Harvard University 1938), instructor in bacteriology and immunology; Charles Peirson Lyman, of Brookline (A.B. Harvard University, 1936, A.M. Harvard University 1939, Ph.D. Harvard University 1942), research fellow in anatomy; Alexander Marble, of Boston (A.B. University of Kansas, 1922, A.M. University of Kansas 1923, M.D. Harvard University 1927), instructor in medicine; Edward Meilman, of Roxbury (A.B. Harvard University 1936, M.D. Harvard University 1940), assistant in medicine; Tom Fite Paine, Jr., of Aberdeen, Mississippi (S.B. Vanderbilt University 1939, M.D. Vanderbilt University 1942), research fellow in medicine; George Pike, of Roxbury (A.B. Harvard University 1932, M.D. Harvard University 1936), assistant in medicine; Eugene Edwin Record, of Boston (S.B. Harvard University 1932, M.D. McGill University 1937), assistant in orthopedic surgery; Carter Redd Rowe, of Fredericksburg, Virginia (A.B. Davidson College 1928, M.D. Harvard University 1933), assistant in orthopedic surgery; Earl Spinks Seale, of Boston (M.D. Tulane University 1935), assistant in ophthalmology; Gerald Shortz, of Kendallville, Indiana (S.B. Indiana University 1934, M.D. Indiana University 1936), assistant in anesthesia; Francis Marott Sinex, of Indianapolis, Indiana (A.B. DePauw University 1943, A.M. Indiana University 1944), teaching fellow in biological chemistry; Arthur Kaskel Solomon, of Cambridge (A.B. Princeton University 1934, A.M. Harvard University 1935, Ph.D. Harvard University 1937), assistant professor of physical chemistry; Howard Ingram Suby, of Newton Center (A.B. University of Wisconsin 1930, M.D. Harvard University 1934), assistant in genitourinary surgery; James Joseph Thomas, of Alliance, Ohio (S.B. Mount Union College 1935, M.D. Ohio State University 1940), assistant in anesthesia; Arthur Wallace Tucker, Jr., of Needham (A.B. Dartmouth College 1937, M.D. Harvard University 1941), assistant in obstetrics;

and William Anthony Weiss, of Philadelphia, Pennsylvania (S.B. Georgetown University 1934, M.D. Jefferson Medical College 1938), assistant in anesthesia.

The College of Physicians of Philadelphia awarded the Alvarenga Prize on July 14, 1946, to Dr. William H. Feldman, of the Mayo Foundation for Medical Education and Research, in recognition of his studies on chemotherapy in tuberculosis.

The Alvarenga Prize was established by the will of Pedro Francisco daCosta Alvarenga, of Lisbon, Portugal, an associate fellow of the College of Physicians, to be awarded annually by the College of Physicians on each anniversary of the death of the testator, July 14, 1883, to the author of a memorial on any branch of and line that is deemed worthy of the prize.

BOOKS RECEIVED

The receipt of the following books is acknowledged, and this listing must be regarded as a sufficient return for the courtesy of the sender. Books that appear to be of particular interest will be reviewed as space permits. Additional information in regard to all listed books will be gladly furnished on request.

Dietotherapy: Clinical application of modern nutrition. Edited by Michael G. Wohl, M.D., associate professor of medicine, Temple University School of Medicine, and chairman, Advisory Committee on Nutrition, Philadelphia Department of Public Health. With a foreword by Russell M. Wilder, M.D., Ph.D., professor of medicine and chief of the Department of Medicine, Mayo Foundation, and member of the Committee on Medicine and of the Subcommittee on Medical Nutrition, Division of Medical Sciences, National Research Council. 8°, cloth, 1029 pp., with 93 illustrations. Philadelphia: W. B. Saunders Company, 1945. $10.00.

This new treatise on nutrition in health and disease is a composite work of fifty-eight recognized authorities in various fields of medicine. The objective of the book is to provide the practicing physician and the student of medicine with the sound knowledge of current advances in and practical applications of the rapidly expanding science of nutrition. The subject matter is divided into three parts: normal nutrition, nutrition in periods of physiologic stress and nutrition in disease. Selected lists of references are appended to each chapter.

Preventive Medicine. By Mark F. Boyd, M.D., C.P.H., field staff member, International Health Division, Rockefeller Foundation. Seventh edition, revised. 8°, cloth, 591 pp., with 187 illustrations and 56 tables. Philadelphia: W. B. Saunders Company, 1945. $5.50.

This standard text has been thoroughly revised and brought up to date. New material has been added, and many divisions have been expanded, rearranged and rewritten. The section dealing with nutrition has been entirely recast in the light of current concepts. Rheumatic fever, leptospirosis and asbestosis are included for the first time. The work is recommended for all medical libraries.

Technical Methods for the Technician. By Anson L. Brown, M.D., director of Dr. Brown's Clinical Laboratory and Dr. Brown's School for Technicians, Columbus, Ohio. Third edition. 8°, cloth, 707 pp., with 229 illustrations. Columbus, Ohio: B. B. Printing Company, 1944.

This standard text written for students and clinical laboratory workers has been thoroughly revised. Many new methods and procedures have been added to the text. The emphasis is on technic, but interpretations are given for most procedures. In this edition new illustrations and colored plates have been added. In the section on serology the author's test for syphilis is presented for the first time. The author concludes his work with a list of one hundred and five standard laboratory reference books. This book should prove valuable to all laboratory workers and serve as a reference source in medical libraries.

Diseases of the Nervous System in Infancy, Childhood and Adolescence. By Frank R. Ford, M.D., associate professor of neurology, Johns Hopkins University. Second edition. 4°, cloth, 1143 pp., with 164 illustrations. Springfield, Illinois: Charles C Thomas, 1944. $12.50.

In this second edition of an authoritative text the many errors of the first edition have been corrected and the author has taken advantage of the helpful criticisms offered to him. Select bibliographies are appended to each disease, and the text is amplified by many pertinent case histories. The book is well printed, with a good type, on good paper and is recommended for all medical libraries and to all those interested in the diseases of the nervous system.

Public Medical Care: Principles and problems. By Franz Goldmann, M.D. 8°, cloth, 226 pp. New York: Columbia University Press, 1945. $2.75.

In this book Dr. Goldmann attempts to give a composite picture of public medical care as a social movement. He deals with community health activities supported by taxation and administered by governmental agencies. In the first part, after a review of the history of public medical care, the author analyzes, interprets and appraises public policy in providing facilities and services for the care of the sick. In the second part he discusses the problem of planning for medical care and shows the potential value of the method of taxation to the development of broad programs of health and social security in the future.

The Autobiography of Science. Edited by Forest R. Moulton, Ph.D., Sc.D., and Justus J. Schifferes. 8°, cloth, 666 pp. Garden City, New York: Doubleday, Doran and Company, Incorporated. $4.00.

The editors of this new history of science have attempted to provide an anthology of the key passages from the master works of all sciences. The selections are in general arranged in chronological order from the time of genesis to modern times. Medicine is well represented in the selections, and this book should be in all historical collections.

Pulmonary Tuberculosis in the Adult: Its fundamental aspects. By Max Pinner, M.D., chief, Division of Pulmonary Diseases, Montefiore Hospital for Chronic Diseases, New York City, and clinical professor of medicine, College of Physicians and Surgeons, Columbia University. 8°, cloth, 579 pp., with 59 illustrations and 3 graphs. Springfield, Illinois: Charles C Thomas, 1945. $7.50.

This new work on pulmonary tuberculosis considers the subject in all its phases as interrelated to each other. Extensive bibliographies are appended to each chapter, and each reference is annotated, a new and time-saving feature in bibliographies.

NOTICES

ANNOUNCEMENTS

Dr. Marcus W. Berman, having returned from military service, announces the opening of his office for the practice of medicine and surgery at 304 Belgrade Avenue, Roslindale.

Dr. Sydney Grace, having returned from military service, announces the reopening of his office at 311 Commonwealth Avenue, Boston, for the practice of obstetrics and gynecology.

Dr. Sidney Olans, having returned from active service with the Army, announces the reopening of his office for the practice of medicine and obstetrics at 20 Intervale Avenue, Medford.

Dr. Robert H. Talkov has returned from military service and will resume the practice of internal medicine with special interest in arthritis and allied rheumatic disease at 375 Commonwealth Avenue, Boston.

(*Notices continued on page xvii*)

NOTICES (*Continued from page 146*)

SOCIETY MEETINGS AND CONFERENCES

Calendar of Boston District for the Week Beginning Thursday, August 1

Friday, August 2

*10:00 a.m.–12:00 m. Medical Staff Rounds. Peter Bent Brigham Hospital.

Tuesday, August 6

12:15–1:15 p.m. Clinicoroentgenological Conference. Peter Bent Brigham Hospital.

Wednesday, August 7

*10:30–11:30 a.m. Medical Clinic. Isolation Building, Amphitheater, Children's Hospital.

*12:00 m. Clinicopathological Conference, (Children's Hospital.) Amphitheater, Peter Bent Brigham Hospital.

*2:30–4:00 p.m. Combined Clinic by the Medical, Surgical and Orthopedic Services. Amphitheater, Children's Hospital.

*Open to the medical profession.

March 15–September 15. Boston University Course for Discharged Medical Officers. Page 240, issue of February 14.

September 4–7. American Congress of Physical Medicine. Page 616, issue of May 2.

September 30–October 3. Industrial Health Congress. Page 878, issue of June 27.

October 6–12. Interamerican Congress of Cardiology. Page xix, issue of June 6.

October 7–18. New York Academy of Medicine. Page 544, issue of April 18.

February 7. American Board of Obstetrics and Gynecology. Page 34, issue of July 4.

District Medical Society

PLYMOUTH

October. Jordan Hospital, Plymouth.
November. Plymouth County Hospital, South Hanson.
January. Brockton Hospital, Brockton.
February. Moore Hospital, Brockton.
March. Goddard Hospital, Brockton.
April. State Farm, Bridgewater.
May. Lakeville Sanatorium, Lakeville.

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